FISHER

GRIDLINK CONFIGURATION SOFTWARE for the GridBoss™ System

User Manual

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SECTION 1 — GETTING STARTED

1.1 USER MANUAL OVERVIEW

1.1.1 Scope

This manual describes how to use the GRIDLINK™ Configuration Software to configure and monitor the GB600-Series Controllers of a GridBoss™ Pressure Control and Management System, such as the GB601 District Regulator (DR) Controller, and the GB602 Low Pressure Point (LPP) Controller. The GridBoss System controls the Setpoint at the District Regulator Controller through an actuator, such as a Kixcel™, I/P, or servo valve. The Setpoint is "predicted" by the historical profile of the District Regulator outlet pressure versus the time-of-day and temperature. The LPP Controller monitors the average pressure for the minute at a low-pressure point downstream from the District Regulator. The average pressure for the minute and change in Setpoint for the regulator is relayed back to the DR Controller when the average pressure for the minute is out of range.

The GRIDLINK software runs on a personal computer (such as a laptop or notebook style) in a MS-DOS® operating system (version 5.0 or higher) or in a DOS window. This manual covers configuration, calibration, monitoring, database archiving, custom displays, and embedded utilities of the GRIDLINK software.

1.1.2 Organization

This manual is organized according to the menu structure of the GRIDLINK software. A section is dedicated to each item on the menu bar. The manual is organized into the following major sections:

- Table of Contents
- Section 1 — Getting Started
- Section 2 — The File Menu
- Section 3 — The Grid Menu
- Section 4 — The I/O Menu
- Section 5 — The Data Menu
- Section 6 — The Display Menu
- Section 7 — The History Menu
- Section 8 — The Utilities Menu
- Section 9 — The System Menu
- Section 10 — The Help Menu
- Appendix A — Timed Duration Output
- Glossary of Terms
- Topical Index

Table of Contents — Lists each section and information contained in that section of the document.

Section 1 — Getting Started describes this manual and mentions related manuals. This section also provides a summary of the GRIDLINK software, installation, hardware overview, basic software functions, user interface, and logging on to the GRIDLINK software.

Section 2 — The File Menu provides information concerning options located under the File menu before and after logging on to GRIDLINK, including: Direct Connect, GridBoss Directory, New, Open, Collect GridBoss Data, Download, Update Firmware, Update Hardware, Convert, Print Configuration, GRIDLINK Security, Macros, and Exit option.

Section 3 — The Grid Menu describes the options located under the Grid menu, including: Comm with LPP, Regulator Control, Holiday Dates, Comm with DRs, and Low Pressure Control.

Section 4 — The I/O Menu provides information detailing options located under the I/O menu, including: AI, AO, DI, DO, and PI.

Section 5 — The Data Menu provides information detailing features located in the Data menu, including: FST, Softpoints, Radio Control, Opcode Setup, and User List Setup.

Section 6 — The Display Menu provides information detailing features located in the Display menu, including: Custom Displays and Monitor options.

Section 7 — The History Menu provides information detailing features located in the History menu, including: History Setup, Min/Max History, Minute History, Hourly History, Day History, Events History, and Alarms History.

Section 8 — The Utilities Menu provides information detailing features located in the Utilities menu, including: Security, Macros, GridBoss Memory, and Calibration Values.

Section 9 — The System Menu provides information detailing features located in the System menu, including: Clock, Information, Flags, Comm Ports, and configuring RBX Alarming.

Section 10 — The Help Menu provides information detailing features located in the Help menu, including: Getting Started, Keys, Help Contents, and About.

Appendix A — Timed Duration Output provides information detailing how to accurately define, set up, and use the various types of Timed Duration Outputs (TDOs).

Glossary of Terms — Defines terms used in Fisher Control's documentation.

Topical Index — Lists alphabetically the items contained in this manual, including the section and page number.

NOTE

In most cases, the GB602 LPP and GB601 DR controllers (either of which may be referred to as a GridBoss) are identical in operation. The descriptions and procedures in all sections apply to both controllers, except where otherwise noted.

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1.3 ADDITIONAL INFORMATION

The physical aspects of the GridBoss units are contained in their respective instruction manuals.

The following manuals include information not found in this manual:

- *GridBoss Instruction Manual (Form A6075)* – Part Number D301132X012
- *GridManager User Manual (Form A6083)* – Part Number D301134X012
- *Function Sequence Table (FST) User Manual (Form A4625)* – Part Number D301058X012
- *ROC/FloBoss Accessories Instruction Manual (Form A4637)* – Part Number D301061X012
- *ROC Protocol User Manual (Form A4199)* – Part Number D301053X12
- *Type 662 Kixcel Remote Control Pilot Drive Actuator* – Part Number D102273X012

1.4 PRODUCT OVERVIEW

To better understand the information contained in this manual, this section provides a brief overview of the operation of the equipment.

1.4.1 GRIDLINK Configuration Software

The GRIDLINK Configuration Software provides the capability to monitor, configure, and calibrate the GridBoss Gas Pressure Control system units. The software runs on an IBM-compatible personal computer (PC) using DOS 5.0 or higher. GRIDLINK can also run as a DOS application with Microsoft® Windows® 3.1, Windows 95®, Windows 98®, or Windows NT®. The software is supplied on a 3.5-inch floppy disk.

Some of the many functions provided are (see Figure 1-2 on page 1-13 for a complete list of functions):

- Configuring I/O points (including Sensor Module inputs), Proportional, Integral, and Derivative (PID) feedback control loop calculations, and the history database.
- Configuring communications setup between the GridBoss 601 District Regulator Controller, the GridBoss 602 Low Pressure Point Controller, and the Host computer.
- Retrieving historical, event, and alarm logged data.

The GRIDLINK software is designed for ease of use. Pull-down menus simplify accessing the functions provided by the software, and dialog boxes help to direct selections and data entry. Actions can be performed with the keyboard or a pointing device such as a mouse. Refer to Section 1.5 for a description of the user interface.

Help screens are accessed either from the Help menu or in a context-sensitive fashion from within the menus and screens. This feature makes it easy to access on-line information for any GRIDLINK topic.

You can build custom displays for the GridBoss units that combine both graphic and dynamic data elements. Using GRIDLINK, the displays can monitor the operation of a GridBoss unit either locally or remotely.

GRIDLINK lets you record custom keystroke sequences called macros, which can "play back" dozens of keystrokes at a time.

The software also provides multiple levels of security for controlling access to GRIDLINK functions, as well as the GridBoss databases. Making changes to passwords or to the access level for personnel is accomplished through the Security menu, which is available only to an authorized person.

1.4.2 GridBoss System Controllers

The GridBoss System uses GB600-Series Controllers, which are pressure measurement computers that automate the delivery of natural gas at an optimized and adequate pressure for natural gas distribution systems. These controllers also perform PID loop control, data archival, and remote communications. The GridBoss System uses two types of controller units: the GB601**District Regulator** (DR) and the GB602 **Low Pressure Point** (LPP) Controller. The DR controller is automated with an actuator such as the Fisher Type 662 Kixcel. An I/P or servo valve may be used in place of the Kixcel. The GB601 provides functions required for measuring the inlet and outlet pressure of the District Regulator, and the GB602 measures the line pressure at the Low Pressure Point.

NOTE

An I/P or servo valve may be used in place of the Kixcel. For ease of readability, "Kixcel" is used throughout this manual to represent all three devices.

The GridBoss System builds load profiles based on ambient temperature and time-of-day, which are then used to determine the "predicted" Setpoint of the District Regulator. The GridBoss System provides on-site functionality and supports remote monitoring, pressure measurement, data archival, communications, and control. The GridBoss System design also allows you to configure specific applications including those requiring calculations, logic, and sequencing control by using Function Sequence Tables (FSTs).

The primary function of the GridBoss system is to control a Setpoint for a District Regulator, which allows the District Regulator to automate the delivering of natural gas at an optimized and adequate pressure. By using history load profiles originating from the Low Pressure Point data and using the load profiles at the District Regulator, the GridBoss system predicts system requirements to improve system integrity and reduce the average system pressure. The LPP GridBoss 602 measures the average line pressure at the Low Pressure Point downstream from the District Regulator. The average line pressure at the Low Pressure Point and the required change in Setpoint for the regulator is relayed back to the District Regulator GridBoss 601 when the LPP pressure goes out of range.

The GridBoss controller has a weather-tight enclosure with a window for a Liquid Crystal Display (LCD) display, which is further protected by a weather shield cover. This display consists of a 2-line by 16-character alphanumeric display to monitor information stored by the GridBoss units.

The enclosure contains a processor circuit board with built-in input/output (I/O), including mounting provisions for batteries, a radio, power converter, and an I/O card. The built-in I/O consists of a direct 4-wire Resistance Temperature Detector (RTD) interface, and a discrete output. Additionally, the District Regulator includes two discrete inputs, two pulse counters, two user configurable pulse or discrete inputs, two discrete outputs, two analog inputs, and one analog output. An optional intrusion switch uses one of the discrete inputs.

The GridBoss system can be operated peer-to-peer between the Low Pressure Point and the District Regulator or as part of a communications system, which includes a Host. Monitored values are processed and stored for access by personnel in the field using either the LCD display of the GridBoss or a notebook personal computer (PC) containing the GRIDLINK Configuration Software. Supervisors and managers at central or field offices can remotely monitor the GridBoss through a Host computer.

The GridBoss units use internal software (called firmware) for gathering input data, converting raw input data into calculated values, storing values, and providing control signals. Two diagnostic inputs monitor input power, battery voltage, and enclosure/battery temperature.

Two basic types of memory are used in the GridBoss units: Read-Only Memory (ROM) and Random Access Memory (RAM). The ROM is programmable (called flash memory). A portion of the ROM holds the firmware, which is programmed by the factory to contain the operating system and various application programs. Another portion of programmable ROM stores certain configuration and default values. The RAM, which is backed up by its own power source, stores history data and additional configuration data. The GRIDLINK software can access both programmable ROM and the RAM.

Further information is provided in the GB600-Series Instruction Manual (Form A6075).

1.5 USER INTERFACE

You interact with the GRIDLINK software using various displays on the computer monitor and the computer keyboard and/or pointing device.

The major components of the GRIDLINK user interface are:

- Menu bar and menus (affected by the security system)
- Function screens
- Dialog boxes
- Keyboard and pointing devices
- Help system, including the Status Line and message boxes

The previous user interface components are presented in Sections 1.4. Section 1.5.1 is an overview of the user interface.

1.5.1 Interface Overview

The GRIDLINK software employs a character-based graphical user interface with a standard Windows menu structure. After logging on to GRIDLINK, you see the available functions displayed in a menu bar with pull-down / drop-down menus. Refer to Figure 1-1. A Status Line at the bottom of the display contains pertinent information about the highlighted item such as a menu option or a parameter. Refer to Figure 1-1.

The menu structure displayed in Figure 1-2 lists choices from which you can select the desired function. Some items, when selected, display another menu that lists additional functions. Once a function is selected, the screen or dialog box for that function displays. This screen or dialog box provides the requested information and allows you enter the applicable configuration data.

A typical screen displays parameters and pushbuttons as displayed in Figure 1-1. Some parameters have values, while others have options. Values are contained in data fields next to the parameter name; many of these values can be changed. Options are listed below the parameter name, with the selected option highlighted.

Pushbuttons display dialog boxes for further configuration details or perform a desired action, such as the Adaptive pushbutton shown in Figure 1-1. The pushbuttons are activated either by clicking with a mouse or by pressing a key (either the Enter key when the pushbutton is highlighted or a function key — see Section 1.5.3).

Dialog boxes are areas that “pop up” inside the current screen to allow further selections or values to be entered. They can also provide messages or information that is more detailed.

1.5.2 Menu Bar and Menus

The menu bar is the first thing that appears on the screen after successfully logging on. Refer to Figure 1-1. The initial menu bar includes only the File and Help menus. When you connect to a GridBoss or open a configuration file, the complete menu bar appears. Note that your security level may limit the menus available to you from the menu bar. Refer to Section 8 for information concerning security levels.

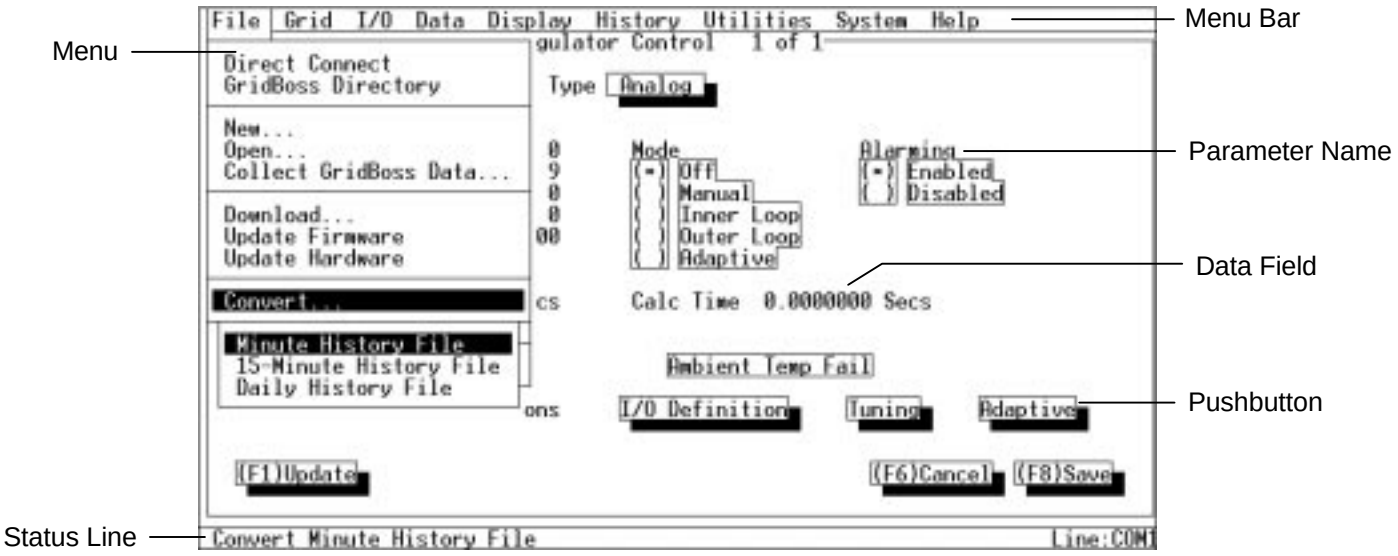

Figure 1-1. Sample GRIDLINK Display

From the menu bar, you can use either the keyboard or the mouse to activate a menu and then to select a function in that menu.

1.5.3 Keyboard and Pointing Devices

There are two methods for "telling" the GRIDLINK software what to do: the keyboard method and the pointing device method. The pointing device can be a mouse, a trackball, or other device. Throughout this manual, the term "mouse" refers to any kind of pointing device you may have.

NOTE

A DOS or Windows mouse driver must be present in your system to use a mouse.

A mouse or trackball is usually easier to use than the keyboard for getting around in the menus and screens. However, the keyboard is still required to enter text and numerical data. If you only have a keyboard, you can perform all the operations of the mouse method, but it may not be as fast as using a mouse, and you need to learn which keys are required for each operation.

1.5.3.1 Using the Keyboard

If you are using the keyboard and the menu bar does not have one of its items (such as File) highlighted, **use the Alt key or the F10 key to activate the menu bar**. Use the **Left Arrow** and **Right Arrow** keys to highlight the menu bar item you want (note the help Status Line at the bottom of the screen provides a brief description of the menu), and then press Enter.

With a menu displayed, you can highlight the desired item by using the **Down Arrow** and **Up Arrow** keys. With the desired item highlighted, press the **Enter** key to activate the function. Instead of using the cursor keys and pressing Enter, you can type the white letter of the menu item (such as "A" for About).

If the menu item is followed by an ellipse (for example, Monitor...), a submenu appears. You can then select an item from the submenu using the same methods as for the menu.

To leave a menu or submenu, press the **Esc** key. You can then select another menu. You can also access another menu simply by using the **Left Arrow** and **Right Arrow** key.

The **cursor movement** keys are the four arrow keys, which are designated as follows:

- Up Arrow (↑)
- Down Arrow (↓)
- Right Arrow (→)
- Left Arrow (←)

The **text scrolling** keys are the **Page Up** and **Page Down** keys.

To use the keyboard in configuration screens and dialog boxes, press the **Tab** key to move in a predetermined sequence from one parameter field or pushbutton to the next. The field or pushbutton becomes highlighted to show you which one is selected. Note that fields unavailable for changes are automatically skipped; they are not highlighted.

When you **Tab** to the last field or pushbutton in the screen or dialog box, pressing the Tab key again jumps back to the first field or pushbutton. To go back to a previous field or pushbutton, press the **Shift** and **Tab** keys together.

In an option field, the currently selected option (marked with an **asterisk** between the parentheses) is highlighted. To select one of the other options, use the **Up Arrow** and **Down Arrow** keys to highlight the desired option, and then press **Enter**. The new selection is then marked with an asterisk (*).

In a field that requires a text or numerical entry, type the required characters or numbers from the keyboard. Use the **Backspace** or **Delete** keys to erase unwanted characters. In a text field, you can use the Right Arrow and Left Arrow keys to move the cursor one character at a time and the **Home** and **End** keys to place the cursor at the beginning and end of the field, respectively.

The following keys or key combinations permit you to perform certain operations pertaining to GRIDLINK.

Alt+X — While holding down the Alt key, press the "X" key to exit or quit the GRIDLINK software.

Esc — In general, this key cancels the current activity. If a screen is active, this key closes the screen and returns you to the last-used place in the menu structure. If a dialog box is active, this key closes the box and returns you to the screen or other place from which the dialog box originated. If a menu is active, this key closes the last-opened menu, taking you up one level in the menu structure. If the menu bar is active, this key de-selects all menu options so that none are highlighted; you then need to use the Alt key or click with the mouse to reactivate the menu bar.

Alt or **F10** — When nothing is highlighted on the menu bar, press the Alt or F10 key to reactivate the bar by highlighting "File." If you are in a screen, pressing the Alt or F10 key activates the menu bar for making a menu selection, which effectively cancels any actions being performed on the screen. To return to the screen from the menu bar, use the Esc key.

F9 — When a menu item or a screen item is highlighted, press the F9 key to display the Help window. Any available information about the item displays. You can use the Index pushbutton in the Help window to get a list of help topics. When you are done with the Help window, use the Cancel pushbutton or the Esc key.

F1 through F8 — In most configuration screens, some of these keys are identified as pushbuttons at the bottom of the screen. When the pushbutton is present, it works as follows:

F1 Update – Revert to the last saved data of the screen or refresh the display with the latest data.

F2 Prev – Page to the previous point of this type. For example, if the screen for Analog Input point number A2 is currently displayed, pressing F2(Prev) causes the screen for point number A1 to display.

F3 Next – Page to the next point of this type. For example, if the screen for Analog Input point number A1 is currently displayed, pressing F3(Next) displays the screen for point number A2.

F4 Copy – Copy the configuration data shown in the current screen to a memory buffer. This copy of the data can then (F5)Paste to another point of the same type to save time in configuring similar points.

F5 Paste – Paste the configuration data saved in the copy buffer using (F4)Copy to the currently displayed screen. This overwrites the data on the screen with the data copied from the similar point. After using F5(Paste), you can make further changes (such as to the Tag). Remember to (F8)Save the data to the GridBoss or to a disk file.

F6 Cancel – Quit the screen without saving any changes that may have been made.

F8 Save – Save changes either to configuration memory in the GridBoss (on-line configuration) or to a disk file (off-line configuration).

1.5.3.2 Using the Mouse

When using a mouse to access the menus, you can activate any item on the menu bar by clicking on the item. Likewise, you can activate any item in a menu by clicking on it. Keep in mind that where the keyboard method highlights an item and then activates it, clicking with the mouse highlights and activates the selected item in one step. If you want, you can press the mouse button and drag the mouse cursor through other menu items or off the menus entirely. Whatever is highlighted (if anything) when you release the mouse button becomes active.

NOTE

A DOS or Windows mouse driver must be present in your system to use a mouse.

Note that in this manual the menus are arranged in a hierarchy to guide you through GRIDLINK. Figure 1-2 on page 1-13 shows the overall menu structure (called a “menu tree”) for GRIDLINK. The names in the menu tree are listed as they appear in the software.

NOTE

Not all menu items are active or appear as options. Certain functions are restricted depending on the type of GridBoss unit and other hardware you are using. Menu items that are not active appear in gray and cannot be accessed. Other menu items specific to a function do not appear at all.

To use the mouse in the screens and dialog boxes, click (press and release) on the field you want to change. For option fields, clicking on an option selects it, marking it with an asterisk (*). For text and number entry fields that can be edited, click on the field to highlight it. Use the keyboard to enter the required characters.

Note that you can move most dialog boxes by dragging them with the mouse. To drag a dialog box, place the pointer on the top border of the box, press and hold the left mouse button (the border turns white), then move the mouse. When the box is where you want it, release the button.

To use the mouse to activate a pushbutton, just click on the pushbutton. To highlight a pushbutton without activating it (such as for viewing the pushbutton's Status Line information), click the mouse button over the pushbutton (which highlights), drag the mouse off the pushbutton, and then release the mouse button.

To use the mouse in list boxes, click on an item in a list to highlight it. Then, after highlighting an item, you can select it with a mouse by double-clicking (clicking twice in rapid succession) on it.

1.5.4 Function Screens

Function screens serve two purposes: to provide information and allow the setting of configuration parameters. Some function screens are strictly for providing information; however, most serve both purposes.

Function screens (also called "screens") appear when a menu function is selected. Screens typically have a title (such as Regulator Control) and a thin-line border. With the exception of the menu bar and the Status Line, a function screen fills the whole display. A screen typically has the following components:

- Parameter with a value field
- Parameter with an option field
- Pushbutton (standard or function key)

File
- Direct Connect
- GridBoss Directory
- New…
  - DR Configuration
  - LPP Configuration
- Open..
  - Event File
  - Alarm File
  - Minute History File
  - 15-Minute History File
  - Daily History File
  - GridBoss Config. File
- Collect GridBoss Data...[2]
  - All
  - TOD Profiles[3]
  - History
  - Events/Alarms
- Download...[2]
  - GridBoss Config. to Disk
  - Disk Config. to GridBoss
  - TOD Profiles[3]
- Update Firmware[2]
- Update Hardware[2]
- Convert...
  - Minute History File
  - 15-Minute History File
  - Daily History File
- Print Configuration[2]
- GridLink Security[1]
- Macros…[1]
  - Record Macro
  - Play Macro
  - Stop Recording
- Exit

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- Regulator Control[3]
- Holiday Dates[3]
- Comm with DRs[4]
- Low Pressure Control[4]

I/O
- Analog Inputs
- Analog Outputs[5]
- Discrete Inputs[5]
- Discrete Outputs
- Pulse Inputs[5]

Data
- FST...
  - Register
  - Editor
- Soft Points
- Radio Control
- Opcode Setup
- User List Setup

Display
- New Display
- Display on Disk
- Monitor...
  - Discrete Input[5]
  - Discrete Output
  - Analog Input
  - Analog Output[5]
  - Pulse Input[5]
  - Control Loop

History
- Setup
- Min/Max
- Minute
- 15-Minute
- Day
- Events
- Alarms

Utilities
- Security...
  - GridLink Operator
  - GridBoss Logon
- Macros...
  - Record Macro
  - Play Macro
  - Stop Recording
- GridBoss Memory
- Calibration Values

System
- Clock
- Information
- Flags
- Comm Ports

Help
- Getting Started
- Keys
- Help Contents
- About

[1] Initial File menu only
[2] Not included on initial File menu
[3] DR Units Only
[4] LPP Units Only
[5] I/O Card Only

Figure 1-2. Menu Tree for the GRIDLINK Software

1.5.5 Dialog Boxes

Dialog boxes are “pop-up” windows that appear during tasks such as configuration and creating custom displays. Most appear when a pushbutton is pressed in a function screen. Dialog boxes provide additional information and to assist in making selections.

Dialog boxes typically have a thick-line border such as the Data title bar. A dialog box overlays part of the screen area of the display. The dialog box can be moved with a mouse by dragging its top border. Note that data in the screen behind the dialog box can be changed even with the dialog box displayed. A dialog box can have one or more of the following components:

- Parameter with a value field
- Parameter with an option field
- Pushbutton (standard only)
- List box

The first three components also appear in function screens and are described in Section 1.5.4.

The **list box** is typically used to select a file or a point parameter. If a list box has too many entries to fit inside its borders, a scroll bar is provided on the right-hand border of the box. This scroll bar can be used to move the list one item or one page at a time by clicking the scroll bar with the mouse. Keys that are active in the list box are explained in Table 1-1.

Some dialog boxes may have linked list boxes, where the selection in one list box controls the list being viewed in the next. If the item you need is not shown in a linked list box, check the controlling list box for additional lists that may contain the item.

1.5.6 Help System

The major help features in the GRIDLINK software are:

- The Help menu
- Context-sensitive help
- The Status Line

Table 1-1. List Box Key Functions

Key	Function In List Box
Up Arrow (↑)	Highlights the field in the next line above.
Down Arrow (↓)	Highlights the field in the next line below.
Page Up	Displays previous page of choices (if any).
Page Down	Displays next page of choices (if any).
Enter	Selects item in highlighted field for use.
Tab	Moves cursor out of list box into next dialog box component.

The **Help menu** (available from the menu bar) provides on-screen information about getting started with the GRIDLINK software, performing keyboard operations, listing the Help topics, and providing the GRIDLINK version control number. For more information, refer to Section 10.

To display **context-sensitive help** on a menu item, a parameter, or a pushbutton, do the following: with the item, parameter, or pushbutton highlighted, press F9. A Help window (dialog box) appears on the screen. If there are more lines of text than fit in the Help window, you can use the **Page Down** and **Page Up** pushbuttons at the bottom of the Help window. You may also use another scrolling method. Refer to “list box” in Section 1.5.5 to view the rest of the information.

To go directly to an index of help topics, use the **Index** pushbutton. In the resulting list of topics, select the desired topic either by clicking on the name with the mouse, or by using the cursor keys to highlight the name and then press Enter. To leave the Help window and return to where you were, use the Exit pushbutton or press the Esc key.

The **Status Line help** serves two purposes: first, on the left side of the line, brief information about the currently highlighted menu item, configuration parameter, or pushbutton is provided; second, on the right side of the line, the port or file being used for configuration is indicated.

For example, if your cursor is in the Tag field of the AI screen, the left-hand side of the Status Line reads: `Enter a 10 character identifier for this point`. If GRIDLINK is communicating with a GridBoss through the first serial port of the PC, the right-hand portion of the Status Line reads `ONLINE:COM1`.

1.6 SOFTWARE INSTALLATION

1.6.1 Computer Requirements

The GRIDLINK configuration software runs on most IBM-compatible personal computers (PCs). The PC can be a desktop or a portable computer. In any case, the PC should meet the following minimum requirements:

- One high-density 3.5-inch floppy disk drive
- MS-DOS version 5.0 or higher
- 640 Kbytes of base RAM, with 450K available for the GRIDLINK software
- 10 Mbytes of available hard disk space
- Monochrome, CGA, EGA, or VGA video adapter

1.6.2 Software Disk

The GRIDLINK software is delivered on a 3.5 inch, 1.44 Mbyte, serialized diskette. The disk includes the following files:

- `INSTALL.EXE` GRIDLINK installation executable file
- `GRIDLINK.EXE` GRIDLINK executable file
- `INS_MSG.TXT` ASCII text file used for installation messages
- `INSTALL.TXT` ASCII text file used for installation instructions
- `GRIDLINK.LST` ASCII text file used for installation listing instructions

1.6.2.1 Copying a Disk Using DOS

As a precaution, copy the disk and keep the original installation disk as a backup. This ensures that you have an uncorrupted copy of all the files. One way to copy the original installation disk is to use the DOS command called DISKCOPY. You must have the original GRIDLINK installation disk and an extra disk of the same storage capacity to perform the following procedure.

1. At the DOS prompt, type **diskcopy A: A:** and press Enter to copy the original GRIDLINK installation disk to the second disk.
2. Place the source disk (GRIDLINK disk) into your floppy disk drive and press Enter.
3. Remove the source disk and place the second disk in drive A when the prompt appears.
4. Press **OK**.
5. **Remove** the backup copy of the GRIDLINK installation disk.
6. Place the original GRIDLINK installation disk in a safe place and use the new backup disk for installations.

1.6.2.2 Copying a Disk Using Windows 3.1x

As a precaution, copy the disk and keep the original installation disk as a backup. This ensures that you have an uncorrupted copy of all the files. You must have the original GRIDLINK installation disk and an extra disk of the same storage capacity to perform the following procedure.

1. Start the **File Manager**.
2. Select the **A:** drive or the appropriate floppy drive letter.
3. Select **Copy Disk** from the File Manager's Disk menu.
4. Click **Yes** when asked, "This operation will erase ALL data from the destination disk. Are you sure you want to continue?"
5. At the "Insert Source Disk" dialog, **insert** the master GRIDLINK disk into your floppy disk drive and click **OK**.
6. At the "Insert destination disk" dialog, **remove** the GRIDLINK installation disk from the floppy disk drive and **insert** the new disk in the floppy disk drive.
7. Click **OK**.
8. **Remove** the backup copy of the GRIDLINK installation disk.
9. Place the original GRIDLINK installation disk in a safe place and use the new backup disk for installations.

1.6.2.3 Copying a Disk Using Windows 95, Windows 98 or Windows NT

As a precaution, copy the disk and keep the original installation disk as a backup. This ensures that you have an uncorrupted copy of all the files. You must have the original GRIDLINK installation disk and an extra disk of the same storage capacity to perform the following procedure.

1. **Insert** the master GRIDLINK disk into your floppy disk drive (typically the A: drive).
2. Double-click the **My Computer** icon on your desktop.
3. Highlight the **A:** drive.
4. **Right mouse click** on the A: drive icon.
5. Select **Copy Disk**. Refer to Figure 1-3.

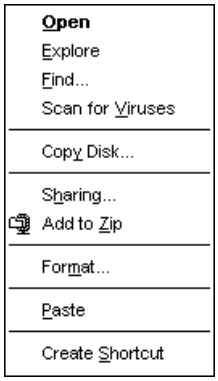

Figure 1-3. Copy Disk

6. Click **Start** to read the source disk (GRIDLINK installation disk); see Figure 1-4.

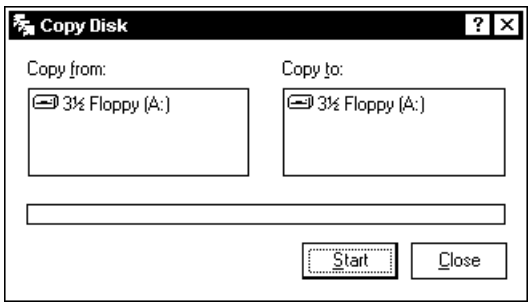

Figure 1-4. Start Copy Disk

7. **Remove** the GRIDLINK installation disk from the floppy disk drive and **insert** the new disk in the floppy disk drive, as instructed by the dialog box shown in Figure 1-5.

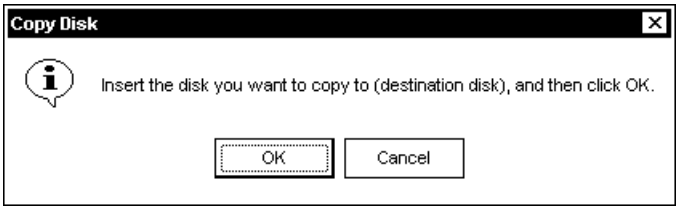

Figure 1-5. Enter New Disk

8. Click **OK**.
9. Click **Close**. Refer to Figure 1-4 on page 1-17.
10. **Remove** the backup copy of the GRIDLINK installation disk.
11. Place the original GRIDLINK installation disk in a safe place and use the new backup disk for installations.

NOTICE

The GRIDLINK software is licensed for the use of the original owner on one computer only. Fisher Controls authorizes the owner to make a copy of the software for the sole purpose of protecting the disk files from loss or damage. Only one copy of the GRIDLINK software may be loaded.

Store the backup (original) disk in a dust-free, dry, cool location. Avoid storing disks near sources of heat, moisture, or magnetic fields, including electrical devices (such as a telephone) that produce magnetic fields.

1.6.3 Software Installation Procedure Using DOS

This section details first time installation of the GRIDLINK software. If you already have a previous version of GRIDLINK installed, refer to Section 1.6.6, Upgrade Procedure, on page 1-22.

To install the GRIDLINK software on a personal computer, perform the following steps.

1. Create a **backup** copy of your GRIDLINK installation disk, as explained previously.
2. **Insert** the GRIDLINK disk in the 3.5-inch floppy drive.
3. Type **A:** at the DOS prompt, where "A" is the location of the floppy drive in the previous step.
4. Type **Install** and press **Enter**. The screen shown in Figure 1-6 appears.

Fisher Controls International
Field Automation Systems
GRIDLINK(TM) Configuration Software
Installation Utility
To install GRIDLINK, enter the desired drive and directory, or use the default, C:\GRIDLINK. Then tab to the Install pushbutton and press ENTER, or click on it with a mouse.
Note 1: If you are running GRIDLINK under Win95 or NT, see the GRIDLINK User Manual (Section 1) for instructions on how to set the idle sensitivity.
Note 2: If you are running GRIDLINK under Windows 3.1 or Win95, and GRIDLINK is going to be installed to a directory other than C:\GRIDLINK, please modify the GRIDLINK.PIF file to have the right directory name.
Target Directory
C:\GRIDLINK
Install
Cancel

Figure 1-6. Install Screen

5. Type in a new **Target Directory** if you want to install the software in a directory other than the default, `C:\GRIDLINK`. **The GRIDLINK default directory is recommended.**
6. Press the **Install** pushbutton. Note that the Cancel pushbutton cannot be used after the installation utility begins.

When installation is complete, the screen displayed in Figure 1-7 appears.

Fisher Controls International
Field Automation Systems
GRIDLINK(TM) Configuration Software
Installation Utility
To install GRIDLINK, enter the desired drive and directory, or use the default, C:\GRIDLINK. Then tab to the Install pushbutton and press ENTER, or click on it with a mouse.
Note 1: If you are running GRIDLINK under Win95 or NT, see the GRIDLINK User Manual (Section 1) for instructions on how to set the idle sensitivity.
Note 2: If you are running GRIDLINK under Windows 3.1 or Win95, and GRIDLINK is going to be installed to a directory other than C:\GRIDLINK, please modify the GRIDLINK.PIF file to have the right directory name.
Target Directory
C:\GRIDLINK
Install
Cancel
Installation is complete, press ENTER to return to DOS.
Copying C:\GRIDLINK\gl101.exe.....

Figure 1-7. Installation Complete Screen

7. Press **Enter** to return to the DOS prompt.
8. **Remove** the GRIDLINK installation disk.
9. **Log on** to GRIDLINK. Refer to Section 1.8, Logging On, on page 1-28.
10. Perform a **Cold Start** using the **Restore config and clear history** parameter. Refer to Section 9.

1.6.4 Software Installation Procedure Using Windows 3.1x

This section details first time installation of the GRIDLINK software. If you already have a previous version of GRIDLINK installed, refer to Section 1.6.6, Upgrade Procedure, on page 1-22.

To install the GRIDLINK software on a personal computer, perform the following steps.

1. Create a **backup** copy of your GRIDLINK installation disk, as explained previously.
2. **Insert** the GRIDLINK disk in the 3.5-inch floppy drive.
3. Start the **File Manager**.
4. Select the **A:** drive or the appropriate floppy drive letter.
5. Double-click the **Install.exe** file. The screen shown in Figure 1-6 appears.
6. Type in a new **Target Directory** if you want to install the software in a directory other than the default, `C:\GRIDLINK`. **The GRIDLINK default directory is recommended.**
7. Press the **Install** pushbutton. Note that the Cancel pushbutton cannot be used after the installation utility begins.

   When installation is complete, the screen displayed in Figure 1-7 appears.

8. Press **Enter** to return to close the DOS install window.
9. **Remove** the GRIDLINK floppy disk.
10. **Log on** to GRIDLINK. Refer to Section 1.8, Logging On, on page 1-28.
11. Perform a **Cold Start** using the **Restore config and clear history** parameter. Refer to Section 9.

NOTE

If you installed GRIDLINK in another directory other than the default GRIDLINK directory, you must edit the GRIDLINK.PIF file to indicate in which directory GRIDLINK resides. Refer to Editing the GRIDLINK.PIF in Windows 3.1x on page 1-22 or Editing the GRIDLINK.PIF in Windows 95, Windows 98, or Windows NT on page 1-23.

1.6.5 Software Installation Procedure Using Windows 95, Windows 98, or Windows NT

This section details first time installation of the GRIDLINK software. If you already have a previous version of GRIDLINK installed, refer to Section 1.6.6, Upgrade Procedure, on page 1-22.

To install the GRIDLINK software on a personal computer, perform the following steps.

1. Create a **backup** copy of your GRIDLINK installation disk, as explained previously.
2. **Insert** the GRIDLINK disk in the 3.5-inch floppy drive.
3. Select the **Start** button.
4. Select **Run**.
5. Type **A:\install** where A: is the location of the floppy drive in step 2.
6. Click **OK**.
7. Type in a new **Target Directory** if you want to install the software in a directory other than the default, `C:\GRIDLINK`. **The GRIDLINK default directory is recommended.**
8. Press the **Install** pushbutton. Note that the Cancel pushbutton cannot be used after the installation utility begins.

When installation is complete, the screen displayed in Figure 1-7 appears.

9. Press **Enter** to close the DOS Install window.
10. **Remove** the GRIDLINK installation disk.
11. **Log on** to GRIDLINK. Refer to Section 1.8, Logging On, on page 1-28.
12. Perform a **Cold Start** using the **Restore config and clear history** parameter. Refer to Section 9.

NOTE

If you installed GRIDLINK in another directory other than the default GRIDLINK directory, you must edit the GRIDLINK.PIF file to indicate in which directory GRIDLINK resides. Refer to Editing the GRIDLINK.PIF in Windows 3.1x on page 1-22 or Editing the GRIDLINK.PIF in Windows 95, Windows 98, or Windows NT on page 1-23.

1.6.6 Upgrade Procedure

This sections details upgrading your GRIDLINK software from a previous version. If this is a first-time installation, refer to Section 1.6.3, Software Installation Procedures, starting on page 1-18. If you are updating your firmware or hardware, refer to Section 2, Update Firmware or Update Hardware.

To install a newer version of the GRIDLINK software on a personal computer, perform the following steps.

1. Create a backup configuration file using the **GridBoss Config to Disk** option detailed in Section 2.
2. Create a **backup** copy of your GRIDLINK installation disk, as explained previously.
3. During the installation, the "**DIR**" files (COMM.DIR and Deflt*xx*.DIR files) are placed into the GRIDLINK directory (or whatever directory you specify). If you specify the same directory as the previous version, these files will be written over. Therefore, if any of these files have been modified but not renamed, their changes will be lost unless you either rename them now or copy them to another directory.
4. Turn off all **FSTs**. Refer to *Function Sequence Table (FST) User Manual (Form A4625)*.
5. **Install** GRIDLINK using one of the following procedures:
   - Section 1.6.3, Software Installation Procedure Using DOS, on page 1-18.
   - Section 1.6.4, Software Installation Procedure Using Windows 3.1x, on page 1-20.
   - Section 1.6.5, Software Installation Procedure Using Windows 95, Windows 98, or Windows NT, on page 1-21.
5. During the procedure, specify the same directory (typically GRIDLINK) for installation where GRIDLINK is currently installed. After it begins, the installation utility warns you that GRIDLINK.EXE already exists and asks you if you want to overwrite the file. Type "**a**" to replace all existing files.
6. If you copied "**DIR**" files in Step 2, copy them back into the GRIDLINK directory (or whatever directory you are using for the GRIDLINK software). They should replace any "DIR" files that were just installed.
7. Restore the backup configuration file using the **Disk Config to GridBoss** option detailed in Section 2.

1.6.7 Editing the GRIDLINK.PIF in Windows 3.1x

If you installed GRIDLINK in another directory other than the default GRIDLINK directory, you must edit the GRIDLINK.PIF file to indicate in which directory GRIDLINK resides.

1. Select the **Main** program group window.
2. Double-click the **PIF Editor** icon.

3. Select **Open** from the File menu.
4. Navigate to the **GRIDLINK.pif** file located in the Target Directory in which you installed GRIDLINK and click **OK**.
5. Enter the directory path where you installed GRIDLINK in the **Program Filename** field and GRIDLINK.EXE after the directory path. For example, if you installed GRIDLINK in the `C:\Fisher` directory, enter C:\Fisher\GRIDLINK.EXE in the Program Filename field. Refer to Figure 1-8.

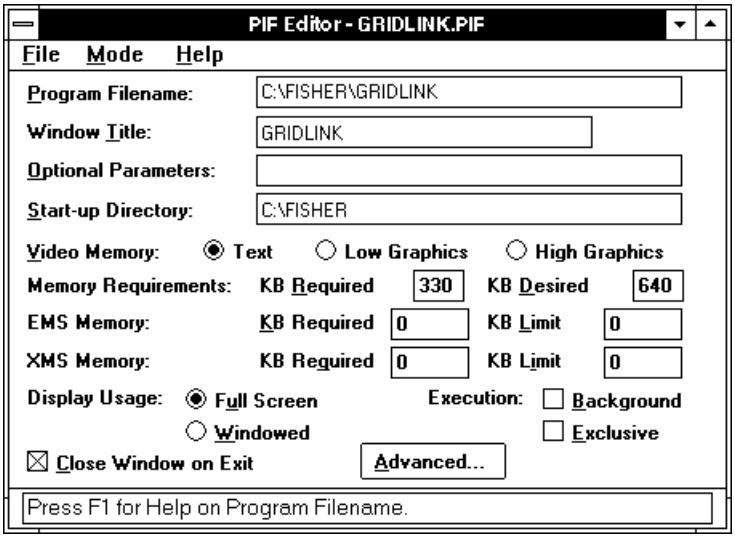
PIF Editor - GRIDLINK.PIF
File Mode Help
Program Filename: C:\FISHER\GRIDLINK
Window Title: GRIDLINK
Optional Parameters:
Start-up Directory: C:\FISHER
Video Memory: Text Low Graphics High Graphics
Memory Requirements: KB Required 330 KB Desired 640
EMS Memory: KB Required 0 KB Limit 0
XMS Memory: KB Required 0 KB Limit 0
Display Usage: Full Screen Windowed
Execution: Background Exclusive
Close Window on Exit
Advanced...
Press F1 for Help on Program Filename.

Figure 1-8. PIF Editor for Windows 3.1x

6. Enter the directory path where you installed GRIDLINK in the **Start-up Directory** field. For example, if you installed GRIDLINK in the `C:\Fisher` directory, enter C:\Fisher in the Start-up Directory field. Refer to Figure 1-8.
7. Select **Save** from the File menu.
8. Select **Exit** from the File menu.

1.6.8 Editing the GRIDLINK.PIF in Windows 95, Windows 98, or Windows NT

If you installed GRIDLINK in another directory other than the default GRIDLINK directory, you must edit the GRIDLINK.PIF file to indicate in which directory GRIDLINK resides.

1. Select (highlight) the **`GRIDLINK`** icon located in the Target Directory in which you installed GRIDLINK.

2. **Right-mouse** click on the `GRIDLINK.EXE` icon to display options as in Figure 1-9.

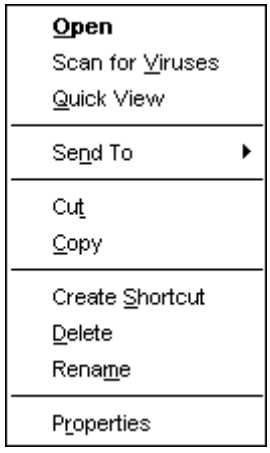

Figure 1-9. GRIDLINK.EXE Options

3. Click the **Properties** option as displayed in Figure 1-9 to display the GRIDLINK.EXE Properties dialog.
4. Click the **Program** tab. Refer to Figure 1-10.
5. Enter the directory path where you installed GRIDLINK in the **first** field. For example, if you installed GRIDLINK in the `C:\FISHER\GRIDLINK` directory, enter C:\FISHER\GRIDLINK\ in the first field. Refer to Figure 1-10.
6. Enter **GRIDLINK.EXE** in the Cmd line field.
7. Enter the directory path where you installed GRIDLINK in the **Working** field. For example, if you installed GRIDLINK in the `C:\FISHER\GRIDLINK` directory, enter C:\FISHER\GRIDLINK\ in the first field. Refer to Figure 1-10.
8. Click **Apply**.
9. Click **OK**.
10. Refer to Section 1.6.9, **Using Windows 95, Windows 98, or Windows NT**, on page 1-25.

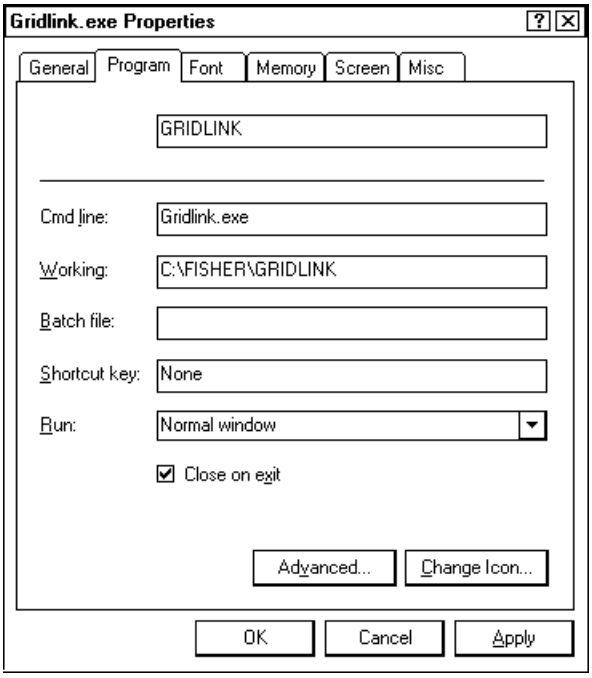

Figure 1-10. GRIDLINK.EXE Program

1.6.9 Using Windows 95, Windows 98, or Windows NT

When using GRIDLINK under the Windows 95, Windows 98, or Windows NT DOS prompt, it may be necessary to adjust the Idle Sensitivity setting of the `GRIDLINK.EXE` file.

1. Select (highlight) the **`GRIDLINK.EXE`** icon located in the Target Directory in which you installed GRIDLINK.
2. **Right-mouse** click on the `GRIDLINK.EXE` icon
3. Click the **Properties** option as displayed in Figure 1-9.
4. Click the **Misc** tab as displayed in Figure 1-11.

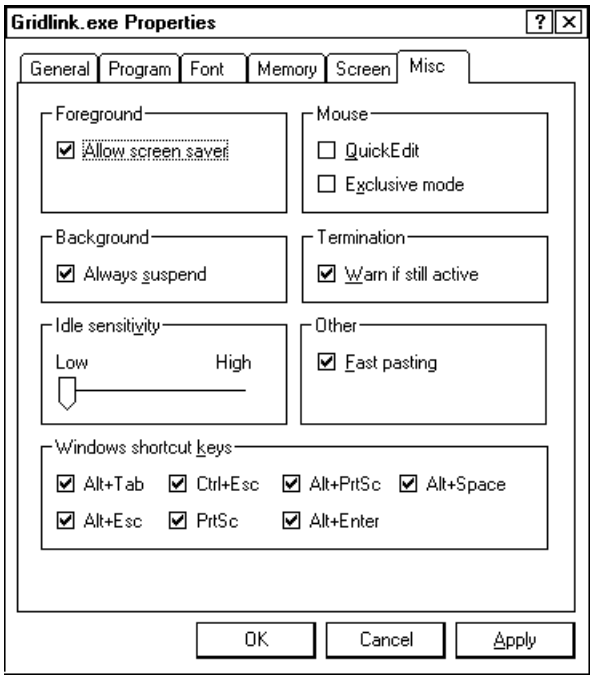

Figure 1-11. GRIDLINK.EXE Properties

5. Move the **Idle sensitivity** slider to **Low**.
6. Click **Apply**.
7. Click **OK**.

1.7 STARTING THE GRIDLINK SOFTWARE

To run the GRIDLINK software from a DOS prompt, perform the following steps (note that a GridBoss does not need to be physically connected at this point):

1. Ensure that the current disk drive and directory is the one in which the GRIDLINK software is installed.

NOTE

If you have added the drive and directory of the GRIDLINK software to the PATH statement in your `AUTOEXEC.BAT` file, then you can skip this step.

OR

If a batch file, named `GRIDLINK.BAT`, has been written that sets the drive and directory and can be located by the PATH statement, you can skip this step. See your DOS user manual for information on modifying the PATH statement or writing a batch file.

To change the current drive, at the DOS prompt type in the drive letter followed by a colon (such as `C:`) and press Enter. To change the current directory, type **`CD`** followed by a space, a backslash, and the Target Directory name (such as `CD \GRIDLINK`), and then press **Enter**.

2. Type **`GRIDLINK`** at the DOS prompt and press **Enter** or double-click the `GRIDLINK.EXE` icon file.

The software loads and initializes. The time this tames depends on the speed of your computer.

NOTE

You can only run one version of GRIDLINK at a time. GRIDLINK does not support multiple copies of GRIDLINK running on the same computer at the same time.

1.8 LOGGING ON

When the GRIDLINK software is loaded, the log-on screen displays as shown in Figure 1-12.

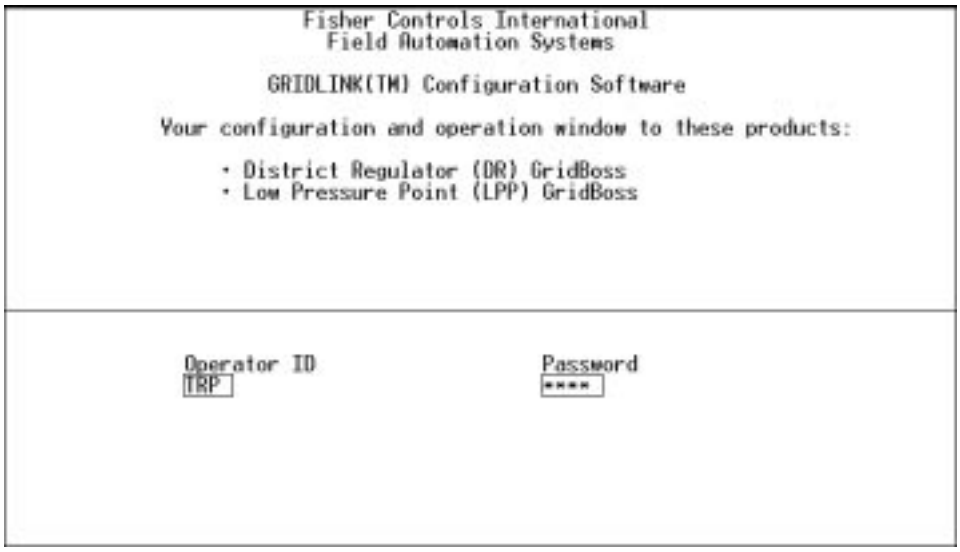

Figure 1-12. Operator Log-On Display

1. Type your assigned 3-character identifier (ID) in the **Operator ID** field and press Enter or Tab. Your initials are typically your identifier. The characters show up in the field below "Operator ID" on the screen. If identifiers have not yet been assigned, try using the default Level 1 identifier of AAA with a Password of 1000 or the default Level 6 identifier of **APC** with a Password of 1234. Identifiers are assigned by using the security features of the GRIDLINK software as explained in Section 8.

   Initially, you may access GRIDLINK and the GridBoss as the Administrator using the default the values:

   - **Operator ID — APC**
   - **Password — 1234**

2. Type your assigned 4-digit **Password** and press Enter. For added security, the software displays an asterisk for each number that you type. If passwords have not yet been assigned, try using the default password of **1234**. GRIDLINK compares the entered identifier and password to a list of valid ones. If the entries are valid, further access to the software is allowed, beginning with the initial menu bar (File and Help menus only).

   If the log-on is not valid, the following message displays:

   ```
   The ID or Password is not correct, please ENTER to try again!!
   ```

Press Enter and repeat steps 1 and 2. You can repeat the procedure as many times as needed until you successfully enter a valid Operator ID and Password. If you want to exit from the log-on screen, press Esc. This aborts the GRIDLINK software and returns you to the point where you started GRIDLINK.

If security is enabled for the port being used by GRIDLINK to communicate with the GridBoss (such as the local operator interface port), then your Operator ID and Password must also be valid for the unit. For example, if you activate the Direct Connect command (which uses the local port) and security is enabled for the local operator interface (LOI) port, your Operator ID and Password must be found in the Security list before you are allowed to connect to the GridBoss to access the complete menu bar. Refer to the Security function in Section 8.

NOTE

You can only run one version of GRIDLINK at a time. GRIDLINK does not support multiple copies of GRIDLINK running on the same computer at the same time.

1.9 CONNECTING THE COMPUTER TO THE GRIDBOSS

The computer running the GRIDLINK software physically connects to the GridBoss through a cable. For a local connection, this cable is typically a prefabricated operator interface cable (available from Fisher Controls). One end of the cable (a 9-pin, D-shell, female connector) plugs into a serial communications port on the computer running the GRIDLINK software. The other end of the cable plugs into the GridBoss operator interface connector. This connector is a round, screw-cap-protected connector located on the bottom of the GridBoss enclosure. Alternately, a null-modem style cable can be connected to the LOI (Local Operator Interface) terminals on the GridBoss. A null-modem cable links the GridBoss to the computer in place of a modem connection. It is very important that the pin out for the null-modem cable be correct. Refer to your hardware manual concerning LOI cable pin outs.

To connect the computer to a remotely located GridBoss controller, a serial or dial-up modem communications line must be installed. The Host and remote GridBoss units use COM1.

Whether the computer running the GRIDLINK software is connected locally or remotely, the communication ports on the computer and the GridBoss must be configured similarly. The computer's communications port is configured using the GridBoss Directory function described in Section 2.4. The GridBoss communications port (either LOI or COM1) is configured using the Comm Ports function in Section 9.5. The Host communications is configured using the Comm Ports Modem function in Section 9.5.1.

If the ports on both the computer and the GridBoss are configured properly, then a Connect command causes the computer to begin communicating with the GridBoss. For connecting to a GridBoss locally (using the Local Operator Interface port), use the Direct Connect option of the File menu to establish communications. The Connect command causes GRIDLINK to initiate communications with the GridBoss by performing a search of the PC communication ports at various baud rates. GRIDLINK locates the first Comm Port and Baud Rate that are successful in communicating with a GridBoss. See the Direct Connect function in Section 2.3 for more information.

For connecting to a GridBoss remotely (through the Host port COM1) or to force local communications to take place in a certain way (such as through a selected PC port or at a selected Baud Rate), use the Connect pushbutton available through the GridBoss Directory option of the File menu. Refer to Section 2.4 for more information.

1.10 CONFIGURATION OVERVIEW

Configuration of a GridBoss system can be performed off-line or on-line. The advantage of off-line configuration is the ability to perform most of the configuration without connecting to the GridBoss. This is especially an advantage if you are modifying the configuration of an operating GridBoss, since it can minimize down time. Off-line configuration is performed by taking an existing configuration file, opening it, and making the desired changes. See Section 2 for details on the Open function in the File menu.

1.10.1 Configuration

The configuration procedure involves using many of the menu functions in roughly this order (note that some may not be required for your application):

- System menu > Information for English or Metric unit selection
- System menu > Clock
- Grid menu > Comm with LPP, Regulator Control, and Holiday Dates (GridBoss 601 District Regulator)
- Grid menu > Comm with DRs and Low Pressure Control (GridBoss 602 Low Pressure Point)
- File menu > GridBoss Directory (PC communications)
- I/O menu > AO or DO (Two DOs acting as TDOs)
- I/O menu > AI (Only when AO is used)
- I/O menu > DI (Intrusion Switch)
- I/O menu > PI (Not required by the GridBoss GPC system)
- History menu > Setup
- Data menu > User List Setup (LCD display)
- System menu > Comm Ports (DR and LPP communications)
- System menu > Comm Ports > Modem (Host communications)
- Data menu > Radio Control
- Data menu > FST
- Utilities menu > Security
- System menu > Flags (for saving to internal configuration memory)
- Display menu > New Display

1.10.2 Duplicating a Configuration

Once you have completed the configuration for one GridBoss, you can duplicate the configuration for a similar GridBoss by using these menu functions in the following order:

1. File > Download > **GridBoss Config. to Disk** which saves the configuration to a specified file.
2. File > **Direct Connect** or **GridBoss Directory** that physically connects the second unit, and then communicates using this function.
3. File > Download > **Disk Config. to GridBoss** opens the configuration file and loads it into the second GridBoss unit.

After you have loaded configuration data into the second GridBoss (Step 3 above) and changed it as required, you can save the configuration to its own disk file by using Step 1. Refer to Section 2 for further information on each of the functions previously mentioned.

1.10.3 Communications Overview

The GridBoss system consists of LPP units, DR units, and a Host computer system. Both the LPP and DR units communicate with the Host Computer. Communication can be originated by the Host computer or by the LPP/DR units as an RBX. Refer to Section 9, Configuring Report-by-Exception.

The LPP unit can communicate with up to five DR units (Grid>Comm with DRs). Each DR contains information about the LPP that validates the communication (Grid>Comm with LPP).

In each LPP, the System>Information screen is used to enter the Station name, Address and Group of the LPP. Refer to Section 9, System Information. The System>Comm Ports>Modem screen is used to enter the Host telephone number (Connect Command). Refer to Section 9, Modem.

In each LPP, the Grid>Comm with DRs is used to configure the DR Tag name, DR Address, DR Group and telephone number to the DR (DR Connect Command). Each DR must be individually configured. Use the (F2)Prev and (F3)Next pushbuttons to view each DR configuration. The Comm with DRs screen is detailed in Section 3.

In each DR, the System>Information screen is used to enter the Station name, Address and Group of the DR. Refer to Section 9, System Information. The System>Comm Ports>Modem screen is used to enter the Host telephone number (Connect Command). Refer to Section 9, Modem.

In each DR, the Grid>Comm with LPP screen is used to configure the LPP Tag name, LPP Address and LPP Group of the LPP assigned to control this DR. The Comm with LPP screen is detailed in Section 3.

It is recommended that the DR and LPP configuration information along with the communications parameters such as Baud Rate be configured **before** the units are deployed in the field. Each unit should be marked or labeled. This allows further configuration from a central location. The Sensor Module transducer calibrations should be recorded and if known, should be configured before the units are deployed. It is also useful to synchronize the Date and Time in each unit. Refer to New>DR Configuration and New>LPP Configuration in Section 2.

1.10.4 GRIDLINK Screen Colors

The GRIDLINK screens are made up of different types of objects, such as windows, list boxes, radio buttons, and pushbuttons. Each type of object has its own color scheme, which is a collection of color attributes that apply to that particular type of object. Windows, for example, have different color attributes for the border, title, and background. Data entry objects have highlighted, normal, and unavailable color attributes. GRIDLINK uses an array of eight color attributes to define each color scheme. Each member of the array is a two-byte integer and is named a1, a2,…, a8. Depending on the object type, all eight attributes may or may not be used. The default object color schemes (COLOR1 through COLOR19) and an additional custom color scheme (COLOR21) are defined in the `GRIDLINK.INI` file and read when GRIDLINK is started. The color schemes and their attributes are described next.

COLOR1 – Default Root Window
a1 = Border attribute
a3 = Title attribute
a5 = Background attribute

COLOR2 – Default Window
a1 = Border attribute
a3 = Title attribute
a5 = Background attribute

COLOR3 – Default Status Window
a3 = Title attribute
a5 = Background attribute

COLOR6 – Default Help List Box
a1 = Border attribute
a2 = Non-active highlight bar attribute
a3 = Normal attribute
a4 = Active highlight bar attribute
a5 = Unavailable attribute

COLOR7 – Default Help Push Button
a1 = Active attribute
a2 = Non-active attribute
a3 = Unavailable attribute

COLOR8 – Default Help Window
a1 = Border attribute
a3 = Title attribute
a5 = Background attribute

COLOR10 – Default Push Button
a1 = Button text active
a2 = Button text non-active
a3 = Button text unavailable
a4 = Box/Border active
a5 = Box/Border non-active
a6 = Button text down
a7 = Button shadow attribute

COLOR11 – Default Radio Button
a1 = Marker active attribute
a2 = Text normal attribute
a3 = Text unavailable attribute
a4 = Text normal when active
a5 = Text unavailable when active

COLOR12 – Default Check Box
a1 = Marker active attribute
a2 = Text normal attribute
a3 = Text unavailable attribute
a4 = Text normal when active
a5 = Text unavailable when active

COLOR13 – Default String Entry Field
a1 = Active field attribute
a2 = Non-active field attribute
a3 = Unavailable field attribute
a4 = End cap attribute
a5 = Blocked text attribute
a6 = Up/Down Spinner Buttons
a7 = Drop Down Button

COLOR14 – Default Numeric Entry Field
a1 = Active field attribute
a2 = Non-active field attribute
a3 = Unavailable field attribute
a4 = End cap attribute
a5 = Blocked text attribute
a6 = Up/Down Spinner Buttons

COLOR15 – Default Scroll-Bar
a1 = Active field attribute
a2 = Non-active field attribute
a3 = Unavailable field attribute
a4 = End arrow attribute
a5 = Border attribute
a7 = Shadow attribute

COLOR17 – Default Edit Box
a1 = Active border attribute
a3 = Normal display attribute
a5 = Non-active border attribute

COLOR18 – Default List Box
a1 = Border attribute
a2 = Non-active highlight bar attribute
a3 = Normal item text attribute
a4 = Active highlight bar attribute
a5 = Unavailable item text attribute

COLOR19 – Default Menu
a1 = Border attribute
a2 = Check mark attribute
a3 = Normal text attribute
a4 = Highlight bar attribute
a5 = Available key normal
a6 = Available key and check mark highlighted
a7 = Unavailable attribute, for all text, key, and checkmark

COLOR21 – Template Radio Button
a1 = Marker active attribute
a2 = Text normal attribute
a3 = Text unavailable attribute
a4 = Text normal when active
a5 = Text unavailable when active

1.10.4.1 Adjusting Screen Colors for Monochrome Displays

To adjust the GRIDLINK screen colors to display correctly on a monochrome display:

1. Double-click the GRIDLINK.INI file located in the directory where you installed GRIDLINK.
2. Open the GRIDLINK.INI file using Notepad or another text editor.
3. Copy the following text into the **`; Color schemes`** section of the GRIDLINK.INI file.

```
@@COLOR1
07,07,07,07,07,07,07,07,   /* Root window */

@@COLOR2
07,07,0F,0F,70,70,70,70,   /* Default window */

@@COLOR3
70,70,70,70,07,70,00,00,   /* Default status window */

@@COLOR4
0F,0F,0F,0F,70,70,70,70,

@@COLOR5
8F,8F,70,70,70,70,70,70,

@@COLOR6
70,70,07,07,70,00,00,00,   /* Default help list box */

@@COLOR7
70,70,07,07,70,00,00,00,   /* Default help push btn */

@@COLOR8
70,70,07,07,70,00,00,00,   /* Default help window */

@@COLOR9
70,70,7F,7F,70,00,00,00,

@@COLOR10
7F,70,70,00,00,00,70,00,   /* Default pushbutton */

@@COLOR11
7F,70,70,00,00,00,70,00,   /* Default radiobutton */

@@COLOR12
7F,70,70,00,00,00,70,00,   /* Default checkbox */

@@COLOR13
70,09,01,01,00,00,00,00,   /* Default string entry field */
```

```
@@COLOR14
70,09,01,01,00,00,00,00,   /* Default numeric entry field */

@@COLOR15
7F,70,70,70,70,00,70,00,   /* Default scroll-bar */

@@COLOR16
00,00,00,00,00,00,00,00,

@@COLOR17
0F,10,70,0F,07,00,00,00,   /* Default editbox */

@@COLOR18
0F,10,70,0F,07,00,00,00,   /* Default listbox */

@@COLOR19
7F,70,70,07,70,70,70,07,   /* Default menu */

@@COLOR21
7F,70,70,07,00,00,70,00,   /* Template radio button */
```

4. Save the GRIDLINK.INI file.

SECTION 2 — THE FILE MENU

2.1 SCOPE

This section describes how to connect the GRIDLINK Configuration Software to the GB600-Series Controllers. This section also contains information for accessing the GridBoss controllers, creating, saving, loading, documenting configuration files, and exiting the GRIDLINK Configuration Software. This section contains the following information:

Information	Section	Page Number
File Menu Overview	2.2	2-2
Direct Connect	2.3	2-3
GridBoss Directory	2.4	2-4
GridBoss Directory Advanced Features	2.4.1	2-7
Establishing GridBoss Directory Groups	2.4.2	2-10
Communication Problems	2.4.3	2-10
New…	2.5	2-11
DR (District Regulator) Configuration	2.5.1	2-12
LPP (Low Pressure Point) Configuration	2.5.2	2-12
Open…	2.6	2-12
Collect GridBoss Data	2.7	2-14
All	2.7.1	2-15
TOD Profiles	2.7.2	2-16
Viewing TOD Profiles	2.7.2.1	2-16
Events/Alarms	2.7.3	2-19
History	2.7.4	2-19
Download…	2.8	2-20
Save GridBoss Configuration to Disk	2.8.1	2-20
Load Disk Configuration	2.8.2	2-21
Load TOD Profiles	2.8.3	2-22
Update Firmware	2.9	2-23
Update Hardware	2.10	2-25
Convert…	2.11	2-27
Print Configuration	2.12	2-29
GRIDLINK Security	2.13	2-30
Macros…	2.14	2-30
Exit Alt+X	2.15	2-30

2.2 FILE MENU OVERVIEW

The File menu contains all functions associated with accessing the GridBoss, creating, saving, loading, documenting configuration files, and exiting the GRIDLINK Configuration Software. The File menu appears initially, before connecting to a GridBoss, as shown in Figure 2-1. After GRIDLINK connects to a GridBoss, or opens a configuration file (for off-line configuration), the menu appears with the selections displayed in Figure 2-2. For off-line configuration, the Collect GridBoss Data, Update Hardware, Update Firmware, Print Configuration, and Download functions are unavailable.

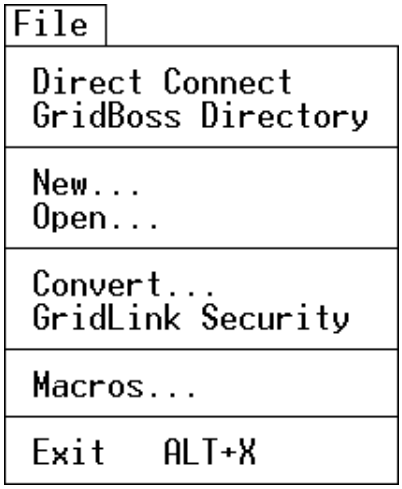

*Figure 2-1. File Menu **Before** Connecting*

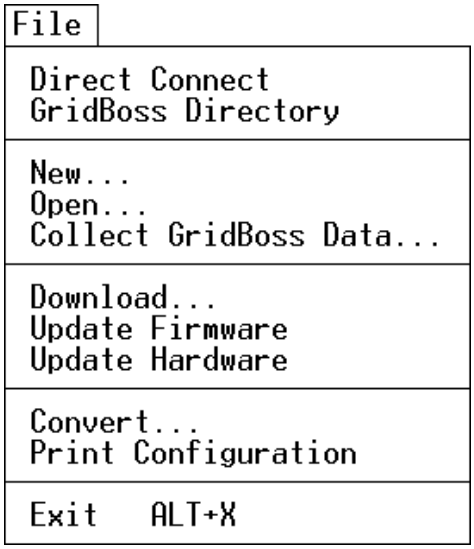

*Figure 2-2. File Menu **After** Connecting*

2.3 DIRECT CONNECT

The Direct Connect option allows you to set up communications with the GridBoss quickly if the default communication parameters apply. For the Direct Connect option to work, security conditions must be met, and the IBM-compatible personal computer (PC) must be connected to the LOI port of the GridBoss with communication settings of:

- 8 data bits
- 1 stop bit
- No parity

Refer to Section 8 for instructions on setting the Security options.

NOTE

An LOI cable may be purchased as an accessory from Fisher Controls.

When you launch GRIDLINK, select Direct Connect to establish a connection through the **LOI** port of the GridBoss currently attached to the PC. After your initial connection, you may set up other communication parameters.

After selecting Direct Connect from the File menu, the GRIDLINK program attempts to establish communications through COM1 of the PC at one of the following baud rates: 19200, 9600, and 4800. If this is unsuccessful, the program then attempts to establish communications through COM2, COM3, and COM4 of the PC, successively, until it receives a valid reply. If the link is established with the GridBoss, the GRIDLINK menu bar is updated in keeping with the available functions.

One of two events can occur when using Direct Connect:

- If a communications link is established with the PC, the Status Line reads **On-Line: COM*x***, where ***x*** is the communications port number being used.
- If a communications link is not established with the PC, the message **Comm Fail** appears in the Status Line, indicating that no connection could be made. You also receive the response "No Response from GridBoss, Press Enter to continue." In this case, you must press Enter to release the program.

If the Direct Connect communication link fails (**Comm Fail**), use the **GridBoss Directory** feature to establish a connection to your GridBoss. Refer to GridBoss Directory on page 2-4. The GridBoss Directory option allows you to change your communications port, time-out settings, and other variables used by the GridBoss units when establishing a communications link to your computer.

A **Comm Fail** can also occur if the GRIDLINK software stands idle for too long. In this case, simply log back into GRIDLINK using Direct Connect or the GridBoss Directory feature.

2.4 GRIDBOSS DIRECTORY

The GridBoss Directory option allows you to select from a previously-defined group of communications setup files that allows GRIDLINK to communicate on a personal computer to an individual GridBoss unit. You may also add, delete, or modify these communication setups and create new groups of GridBoss units. The GridBoss Directory communications setup files are used for setting communications for a computer connected to the GridBoss. Directory communications can use the LOI, COM1, or Phone Modem port at the GridBoss.

The configuration in the GridBoss Directory must match the communications configuration in the PC.

The GridBoss Directory is used to setup personal computer (PC) communications ports (COM ports). The GridBoss Comm Ports and System Information screens are used to set up communications for the specific GridBoss and not the PC. Refer to Section 9.

On startup, GRIDLINK uses the communications parameters configured in the first setup and in the first communications group, `COMM.DIR`. These settings remain in effect until a new setup group is selected.

After selecting GridBoss Directory from the File menu, the Open File dialog box displays, allowing you to select the group file (`*.DIR`) to be opened. Refer to Figure 2-3. Typically, the group `COMM.DIR` is listed first. The `COMM.DIR` is the group that contains the default settings for the LOI, Phone Modem, and COM1 ports in the GridBoss.

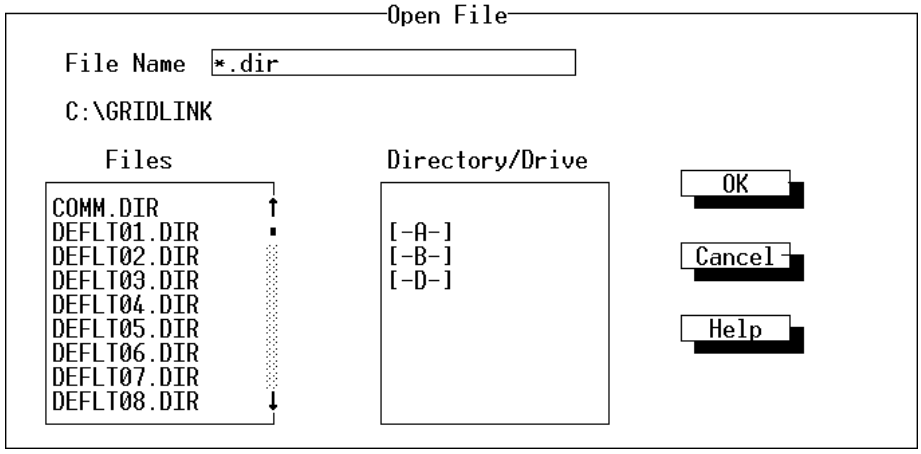

Figure 2-3. GridBoss Directory Group Selection

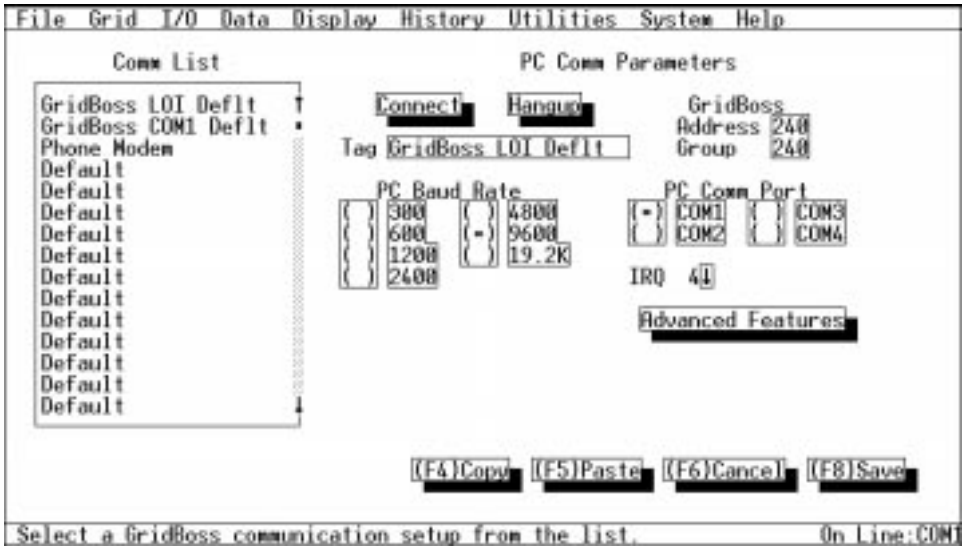

Figure 2-4. PC Comm Parameters Group Dialog

When you select a group file, a list of all GridBoss communication setups in the group appears in the Comm List, along with the PC Comm Parameters. Refer to Figure 2-4. Using this screen, you may configure up to 40 communication setups per group. The GridBoss Directory option allows you to change the communications port, time out settings, and other variables used by the GridBoss when establishing a connection to your personal computer. You may also (F4)Copy and (F5)Paste similar configurations.

NOTE

Your communications parameters must match the parameters setup on your personal computer. Your personal computer's communication parameters are accessed through the computer's Control Panel.

Comm List — Select a communications setup from the list. Upon selecting a setup from the Comm List, you can change the communication parameters or use the Connect pushbutton to establish communications with the associated GridBoss. Notice that three default settings are available:

- GridBoss LOI Deflt
- GridBoss COM1 Deflt
- Phone Modem

Connect — Establish a connection to the GridBoss using the setup currently selected in the Comm List. After setting up your communications settings, click Connect to establish a connection from the PC to the GridBoss.

Hangup — Hangup is used to end a communications session with a modem.

Tag — The 20-character identifier describes the use of the configured parameters for the GridBoss. Use a default name (GridBoss LOI Deflt, GridBoss COM1 Deflt, or Phone Modem) or create your own.

PC Baud Rate — The PC Baud Rate entered is the baud rate set in the PC and is used by GRIDLINK to communicate with the GridBoss through a serial port (COM Port) on the PC either locally or remotely. **For successful communications, the PC Baud Rate setup in the GridBoss by GRIDLINK and the Baud Rate set in the PC using the Control Panel must match.** The default value is 9600 Baud Rate.

If you are having difficulties communicating to your GridBoss, set both the PC Baud Rate in GRIDLINK and your serial port (COM Port) on the Personal Computer to 9600 Baud Rate. Your computer's serial port (COM Port) Baud Rate can be altered from the computer's Control Panel. Once you have altered the PC Baud Rate in GRIDLINK, press (F8)Save. Restart the Personal Computer. Press Connect to establish a connection.

If you are using a remote PC running GRIDLINK to communicate to a GridBoss through a COM port, check the Baud Rate of the port by using the System Comm Ports function described in Configuring Communications Ports in Section 9.

GridBoss Address and Group — The GridBoss Group is the Group with which the GridBoss is associated. The GridBoss Address is the Address of the specific GridBoss within the Group with which you desire to communicate. If you are connected to a multi-drop series of GridBoss units (either DRs or LPPs), enter the exact and unique Address and Group of that specific GridBoss to talk to that device or use the default values of 240. Refer to the System Information screen in Section 9. **Valid entries include 1 - 247.**

If the PC running GRIDLINK is connected directly to the operator interface (LOI) port on the GridBoss, a GridBoss Group of 240 and a GridBoss Address of 240 (the default values) allows access to the GridBoss no matter what Address and Group are configured in the GridBoss.

For a Host port (COM1 Port) on the GridBoss, the configured GridBoss Address and GridBoss Group used by GRIDLINK must match the Address and Group configured in the System Information screen. Refer to Section 9.

PC Comm Port — This parameter selects the communications port on the Personal Computer to be used by GRIDLINK. The communications port is only for the setup currently selected in the Comm List. **For successful communications, the PC Comm Port set up in GRIDLINK and the COM Port set up using the Control Panel on the Personal Computer must match.** The GridBoss can communicate through COM1, COM2, COM3, or COM4 of the PC, depending on your computer's configuration. Your computer's serial port (COM Port) can be altered from the computer's Control Panel.

For a Host port (COM1 Port) on the GridBoss, the configured GridBoss Comm Ports settings used by GRIDLINK must match the Host port set in the remote Personal Computer. Refer to Section 9.

IRQ — This parameter selects the hardware Interrupt Request (IRQ) setting on the Personal Computer. The IRQ must not conflict with the serial or bus port used by a mouse or other peripheral device connected to additional communication ports. **For successful communications, the IRQ set up in GRIDLINK must match the IRQ set up for the COM Port being using on the PC.** You can view the PC's serial port (COM Port) IRQ from the Windows Control Panel (in Windows 95, 98, or NT), Select Start, Settings, Control Panel, System, Device Manager, open Ports, select desired Com port, click Properties, and finally view the Resources tab).

After setting up your communications settings, click Connect to establish a connection from the PC to the GridBoss.

If a communications link is established with the PC, the Status Line reads **On-Line: COM*x***, where ***x*** is the communications port number being used.

If the communications link is not established with the PC, the message **Comm Fail** appears, indicating that no connection could be made. You also receive the response "No Response from GridBoss, Press Enter to continue." In this case, you must press Enter to release the program. You must reconnect to the GridBoss.

NOTE

If the GridBoss remains idle for too long, you may receive the timeout error "No Response from GridBoss, Press Enter to continue." In this case, you must press Enter to release the program. **You must reconnect to the GridBoss.**

2.4.1 GridBoss Directory Advanced Features

When you select a setup in the Comm List and press the Advanced Features pushbutton, a dialog box appears. Refer to Figure 2-5.

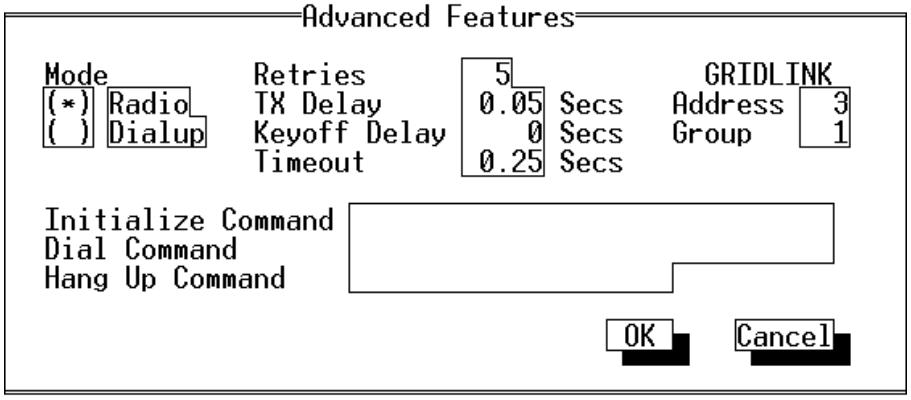

Figure 2-5. GridBoss Directory Advanced Features

Mode — Indicates the type of communications being implemented. Setting this parameter to **Dialup** enables sending the initialize, dial, and hang-up commands to an AT command set-compatible modem. Setting this parameter to **Radio** bypasses the modem commands and uses normal communications. Radio is used for any non-modem type communications.

Retries — This parameter (default is "5") can be set from "0" to "25" to control the number of times after the initial try that the GRIDLINK software attempts to establish communications with the specified GridBoss before reporting a timeout error. The amount of time between retries can be adjusted by using the Timeout parameter. **Adjust the Retries value up if you are having trouble communicating with your GridBoss.**

TX Delay — The TX Delay has a default value of "0.05" seconds. The TX Delay enables the RTS line for the amount of configured delay periods before transmitting data. The delay periods can be set in 0.050-second increments. A delay is typically used to allow a radio or modem to fully enable the transmit mode before data is applied to transmit. In direct wire communications, this value should be set to 0 or 0.05 seconds.

Keyoff Delay — Defines the amount of time to delay before transmitting a response once a valid message has been received and the period to delay before turning the RTS signal off (key-off delay). The default Keyoff Delay is 0 seconds.

Timeout — This is the actual amount of time the GRIDLINK software waits between retries when attempting to communicate through a Comm Port with a GridBoss. **The default time-out is 0.50 seconds, but this can be increased up to 255 seconds if you are having difficulties communicating with your GridBoss.** The communications port requires at least a 0.25-second timeout. Do not enter 0 (zero) in the Timeout field.

GRIDLINK Address — The GRIDLINK Address at the PC has a default value of 3. If more than one computer with GRIDLINK is communicating with a group of GridBoss units, either by radio or by other multi-drop communications, the GRIDLINK Address of each GridBoss must be unique to avoid multiple responses. The GRIDLINK Address must also be different from any other Host system that may access the network. **Valid entries include 1 to 247.**

GRIDLINK Group — The GRIDLINK Group address at the PC has a default value of 1. In the assignment of GRIDLINK Group addresses, the following convention should be used:

Group 0	Reserved, DO NOT USE
Group 1	Host Devices
Group 2 - 99	GRIDLINK Group numbers available
Group 100	Reserved for testing (no CRC in GRIDLINK)
Group 101 - 239	GRIDLINK Group numbers available
Group 240	Reserved
Group 241 - 247	GRIDLINK Group numbers available

Initialize Command — This command initializes the modem to the desired operation parameters. A typical command for AT command set modems is shown in the following example. Refer to the modem manufacturer's instructions for more information.

Initialize Command `~~~+++~~~AT`*`xxx`*

where: `~~~` = 3 second pause
`+++` = send escape code to modem
AT*xxx* = disconnect and perform software reset; *xxx* depends on the type of modem, but some modems use the same command as for hang-up.

Dial Command — This command provides the modem with a telephone number to dial out. This is the telephone number of the GridBoss with which GRIDLINK is trying to communicate. A typical command for AT command set modems is shown in the following example. Refer to the modem manufacturer's instructions for more information.

Dial Command `ATDT 18005151212`

where: `ATD`*`x`* = dial the number 1-800-515-1212
`T` = tone dialing

NOTE

The telephone numbers must include the exact sequence required at the PC. In certain cases, access numbers such as (9) and area codes (1-212) may be required.

Hang Up Command — This command provides the modem with commands for an orderly disconnect or hang-up sequence. A typical command for AT command set compatible modems is the same as the initialize command. Refer to the modem manufacturer's instructions for more information.

Hang Up Command `~~~+++~~~ATZH0`

where: `~~~` = 3 second pause
`+++` = send escape code to modem
`ATZH0` = disconnect and perform software reset

2.4.2 Establishing GridBoss Directory Groups

The GridBoss Directory option allows you to select from a previously defined group of communication setups. This option allows the GRIDLINK program to talk to individual GridBoss units and to add, delete, or modify these setups. You may also create new groups of GridBoss units. The following section details establishing GridBoss groups and individual GridBoss communications setups.

1. Select **GridBoss Directory** from the File menu. Refer to Figure 2-2.
2. Select the group **File Name** in the Files field for the group you desire to alter or select the default COMM.DIR. Refer to Figure 2-3.
3. Enter all Personal Computer **communications information** and Advanced Features if necessary. Refer to Figure 2-4 and Figure 2-5.
4. Press **(F8)Save**.
5. Press **Connect** to establish a connection.

2.4.3 Communication Problems

Occasionally, you may need to alter your GridBoss Directory options when you are having problems communicating with your GridBoss.

1. Select **GridBoss Directory** from the File menu. Refer to Figure 2-2.
2. Select the group **File Name** in the Files field for the group you desire to alter or select the default COMM.DIR. Refer to Figure 2-3.
3. Select an existing file in the **Comm List** to alter a file or select Default to create a new communications file.
4. Place your cursor in the **Tag** field and enter a new configuration name if necessary.
5. Verify that the **PC Baud Rate**, **PC Comm Port**, and **IRQ** address match the values setup in your Personal Computer's Control Panel. If they do not match, alter the appropriate values in GRIDLINK. Refer to Figure 2-4 and the parameter descriptions in section 2.4.
6. Set the **GridBoss Address** to **240** when using the LOI port or the specific **GridBoss Address** of the remote GridBoss with which you desire to communicate.
7. Set the **GridBoss Group** to **240** when using the LOI port or the specific **GridBoss Group** of the remote GridBoss with which you desire to communicate.
8. Press the **Advanced Features** pushbutton. Refer to Figure 2-5.
9. Enter **10** in the **Retires** field.
10. Enter **1** in the **Timeout** field.
11. Press **OK**.
12. Press **(F8)Save**.
13. Press **Connect**.

2.5 NEW…

Use New… in the File menu and select DR Configuration (GB601) or LPP Configuration (GB602) to set up a new configuration for a GridBoss that is not connected to GRIDLINK. Available configuration parameters can be specified using the GRIDLINK software menu selections. You configure the GridBoss configuration file as if you were connected to the device; the main difference is that functions requiring a live connection, such as AI Calibrations, are unavailable in this mode.

When values are saved during this off-line configuration, they are saved to a GridBoss configuration file with the extension .GFC in the default GRIDLINK directory unless you specify otherwise. Once the file is created, it automatically becomes active and you may edit the file. The configuration file may also be loaded into a GridBoss later using the Disk Config. to GridBoss function. Refer to Load Disk Configuration to GridBoss on page 2-21.

Configuration of a GridBoss system can be performed off-line or on-line. The advantage of off-line configuration is the ability to perform most of the configuration without connecting to the GridBoss. This is especially an advantage if you are modifying the configuration of an operating GridBoss, since it can minimize down time. Off-line configuration is performed by taking an existing configuration file, opening it, and making the desired changes.

It is recommended that the DR and LPP configuration information along with the communications parameters such as Baud Rate be configured **before** the units are deployed in the field. Each unit should be marked or labeled. This allows further configuration from a central location. The Sensor Module transducer calibrations should be recorded and if known, should be configured before the units are deployed. It is also useful to synchronize the Date and Time in each unit.

Enter the name of the new configuration in the **File Name** field. Refer to Figure 2-6.

Figure 2-6. Save File Dialog

After entering the File Name and pressing OK, the new file is created. At this point, the new file is open and you may proceed to the appropriate menu items to configure off-line. The File Name displays on the Status Line at the bottom of the screen to indicate the file being used. Note that you see default values, such as found in a previously un-configured GridBoss, in the off-line configuration screens.

2.5.1 DR (District Regulator) Configuration

Use the DR Configuration option to create a new configuration file for the District Regulator Controller while off-line. Off-line configuration files are useful as you can create the files in your office and you can use the files for DRs that have the same basic configuration.

The DR computes load profiles based on ambient temperature and time-of-day to determine the "predicted" Setpoint of the regulator. The RTD reads the ambient temperature. The GridBoss uses the Sensor Module (SM) to acquire the inlet and outlet pressure from the District Regulator.

2.5.2 LPP (Low Pressure Point) Configuration

Use the LPP Configuration option to create a new configuration file for the Low Pressure Point GridBoss 602 while off-line. Off-line configuration files are useful as you can create the files in your office and you can use the files for LPPs that have the same basic configuration. The advantage of off-line configuration is the ability to perform most of the configuration without connecting to the GridBoss. This is especially an advantage if you are modifying the configuration of an operating GridBoss, since it can minimize down time.

The Low Pressure Point GridBoss 602 is located downstream from the District Regulator. The Low Pressure Point (LPP) uses the Sensor Module (SM) sensor to acquire the pressure from the low pressure point in the gas distribution system.

2.6 OPEN…

The Open option allows you to open an existing file. After you select Open from the File menu, a sub-menu appears as in Figure 2-7, allowing you to select one of the following types of files to open:

- Event File – extension `.EVT`
- Alarm File – extension `.ALM`
- Minute History File – extension `.MDB`
- 15-Minute History File – extension `.PDB`
- Daily History File – extension `.DAY`
- GridBoss Config. File – extension `.GCF`

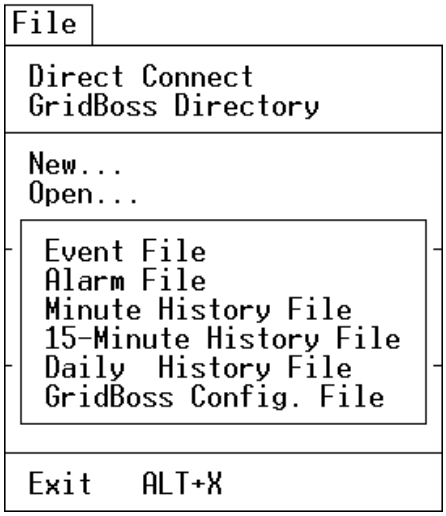

Figure 2-7. Open Menu Options

After selecting the type of file to open, the Open File dialog box displays to allow you to select the file. Refer to Figure 2-8.

Use the Up (↑) and Down (↓) arrow keys to select the desired file in the Files list and then press Enter or press OK. If the desired file is not listed, you can use the scrollable list box on the right to select a drive and directory that has the file you desire. Note that the root directory of a drive is indicated simply by two periods (..). The current drive and directory are displayed below the File Name field.

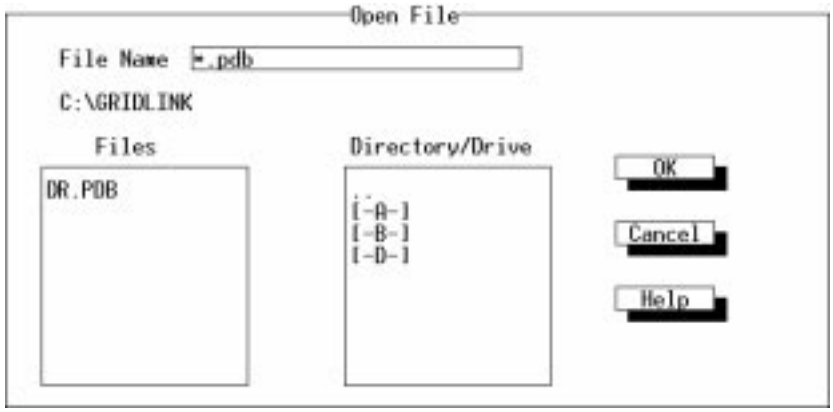

Figure 2-8. Open File Dialog Box

Note that the File Name field merely indicates the types of files currently being listed in the Files list; it cannot be used to enter the name of a specific file.

After selecting an Event, Alarm, or a History file type, the data displays in the same format as live data. Refer to Figure 2-9.

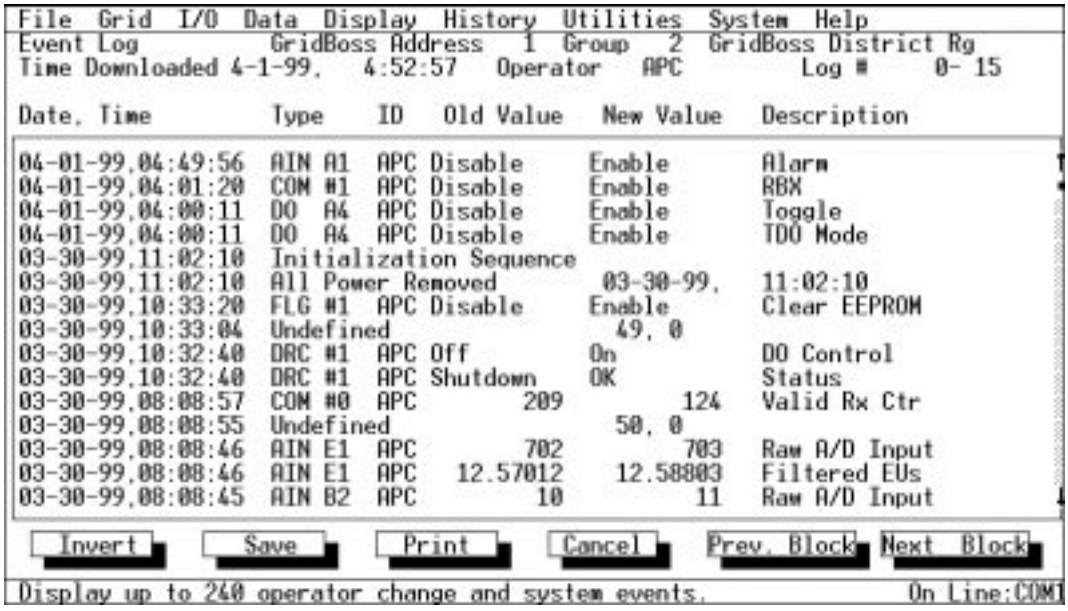
File Grid I/O Data Display History Utilities System Help
Event Log GridBoss Address 1 Group 2 GridBoss District Rg
Time Downloaded 4-1-99, 4:52:57 Operator APC Log # 0- 15
Date, Time Type ID Old Value New Value Description
04-01-99,04:49:56 AIN A1 APC Disable Enable Alarm
04-01-99,04:01:20 COM #1 APC Disable Enable RBX
04-01-99,04:00:11 DO A4 APC Disable Enable Toggle
04-01-99,04:00:11 DO A4 APC Disable Enable TOD Mode
03-30-99,11:02:10 Initialization Sequence
03-30-99,11:02:10 All Power Removed 03-30-99, 11:02:10
03-30-99,10:33:20 FLG #1 APC Disable Enable Clear EEPROM
03-30-99,10:33:04 Undefined 49, 0
03-30-99,10:32:40 DRC #1 APC Off On DO Control
03-30-99,10:32:40 DRC #1 APC Shutdown OK Status
03-30-99,08:08:57 COM #0 APC 209 124 Valid Rx Ctr
03-30-99,08:08:55 Undefined 50, 0
03-30-99,08:08:46 AIN E1 APC 702 703 Raw A/D Input
03-30-99,08:08:46 AIN E1 APC 12.57012 12.58803 Filtered EUs
03-30-99,08:08:45 AIN B2 APC 10 11 Raw A/D Input
Invert
Save
Print
Cancel
Prev. Block
Next Block
Display up to 240 operator change and system events.
On Line:COM1

Figure 2-9. Open Event Log File

After selecting a configuration file type, you may proceed with configuration from the Grid menu, I/O menu, and Data menu as if connected to a GridBoss unit. Select the default configuration file to edit, changing the point configuration that will be used by the "New" function to create new configuration files. The File Name appears on the Status Line at the bottom of the screen to indicate the file being edited.

2.7 COLLECT GRIDBOSS DATA

The Collect GridBoss Data option allows you to easily save various GridBoss data to disk files (or you can use the Save pushbutton when you view logs—see Section 7). After selecting Collect GridBoss Data from the File menu, a sub-menu displays to allow you to select the data you want to save. The menu has four options:

- All
- TOD Profiles
- History
- Events/Alarms

After selecting "All," a default File Name displays in the Save File dialog box. Refer to Figure 2-10.

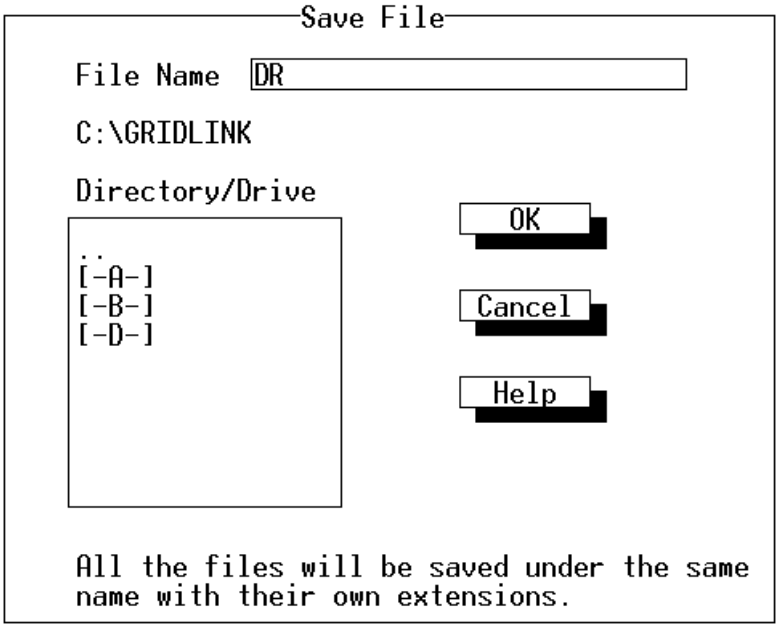

Figure 2-10. Collect GridBoss Data

You can either accept the default File Name or enter a new name under which the file is saved. To change the File Name, type over the existing name.

2.7.1 All

"All" saves:

- Time-of-Day (TOD) load profiles report under *FILENAME*.TOD. (DR only)
- 15 Minute History values under *FILENAME*.PDB.
- Daily History values under *FILENAME*.DAY.
- Events under *FILENAME*.EVT.
- Alarms under *FILENAME*.ALM.

When you select **All** or any other option under Collect GridBoss Data, the associated files are created immediately in the default GRIDLINK directory. The **Collect GridBoss Data (All)** function retrieves the data and stores it in disk files, such as those with an `.TOD` extension

2.7.2 TOD Profiles

When using a District Regulator GB601, the **Collect GridBoss Data (TOD Profiles)** function retrieves the detailed time-of-day load profiles and stores it in disk files, such as those with a .TOD or .PRN extension.

When you select TOD Profiles, all time-of-day load profiles associated with the District Regulator GB601 controller are saved. The first Save File dialog box allows you to enter the File Name for the .TOD files, which are used by the GridBoss. After a short time, a second Save File dialog box displays. The second Save File dialog box allows you to enter the File Name for the .PRN files which are used by you. The .PRN file is the time-of-day profile formatted in a spreadsheet format. A .PRN file can be imported into Microsoft® Excel or other spreadsheet application. You can than use the data to create a graphical representation of your data. Refer to Section 2.7.2.1, Viewing TOD Profiles, on page 2-16.

2.7.2.1 Viewing TOD Profiles

Time-of-day profiles can be saved and viewed in spreadsheet format.

NOTE

The following process describes how to load a TOD Profile using Microsoft Excel. The spreadsheet application with which you are using may differ from the following example.

To view a TOD Profile in Excel:

1. Save a TOD Profile using the Collect GridBoss Data function described in Section 2.7 on page 2-14.
2. Launch **Excel**.
3. Select **Open** from the File menu.
4. Select **All Files** from the Files of Type drop-down list box located at the bottom left of the screen. Refer to Figure 2-11.

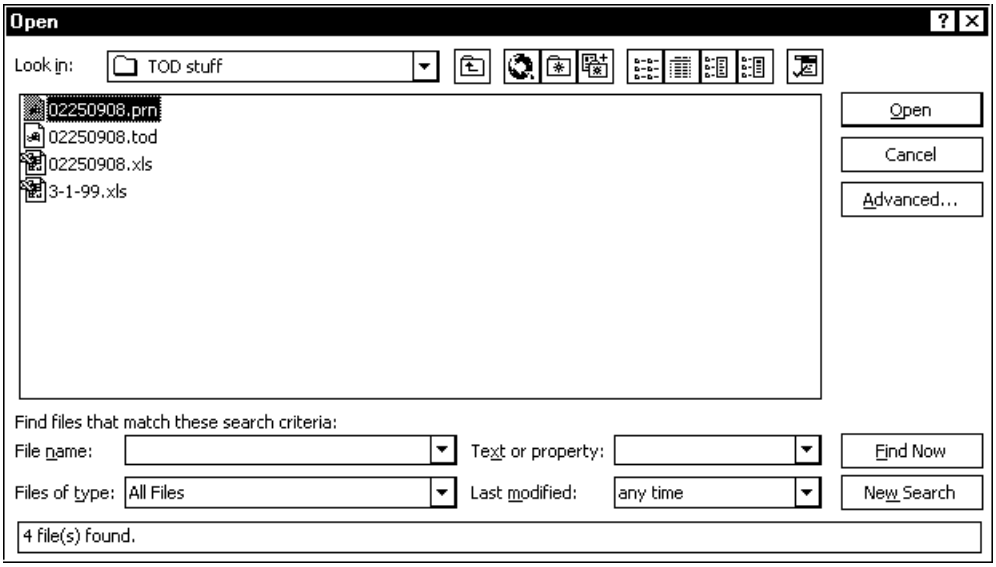

Figure 2-11. Locate TOD Profile (.PRN)

5. Navigate to the correct directory (C:\GRIDLINK\ or where GRIDLINK is installed) where the TOD Profile is stored and select the **.PRN** file. In Figure 2-11, `02250908.prn` is the target file.
6. Click **Open**. Refer to Figure 2-11.
7. Select **Delimited** and **Windows (ANSI)** and click **Next**. Refer to Figure 2-12.

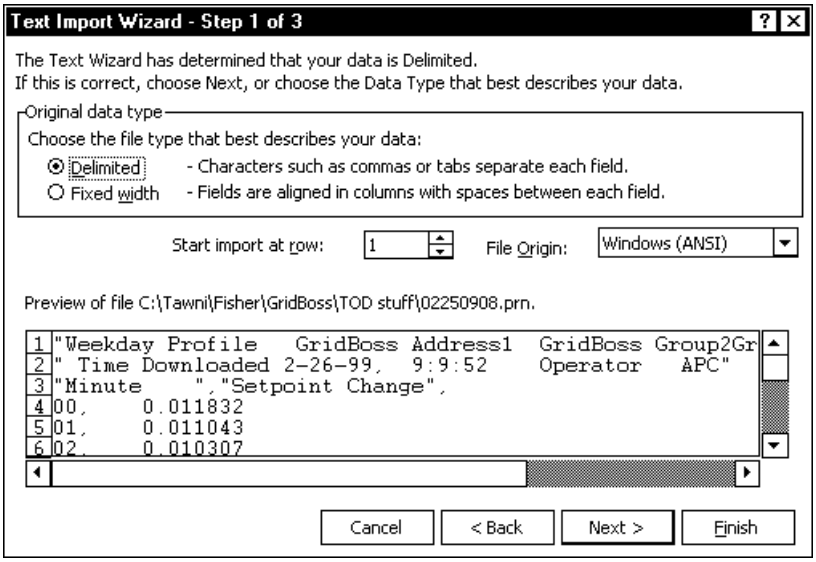
Text Import Wizard - Step 1 of 3
The Text Wizard has determined that your data is Delimited.
If this is correct, choose Next, or choose the Data Type that best describes your data.
Original data type
Choose the file type that best describes your data:
Delimited - Characters such as commas or tabs separate each field.
Fixed width - Fields are aligned in columns with spaces between each field.
Start import at row:
1
File Origin:
Windows (ANSI)
Preview of file C:\Tawni\Fisher\GridBoss\TOD stuff\02250908.prn.
1 "Weekday Profile GridBoss Address1 GridBoss Group2Gr
2 " Time Downloaded 2-26-99, 9:9:52 Operator APC"
3 "Minute ","Setpoint Change",
4 00, 0.011832
5 01, 0.011043
6 02, 0.010307
Cancel
< Back
Next >
Finish

Figure 2-12. Excel .PRN Import 1 of 3

8. Select the **Comma** checkbox and click **Next**. Refer to Figure 2-13.

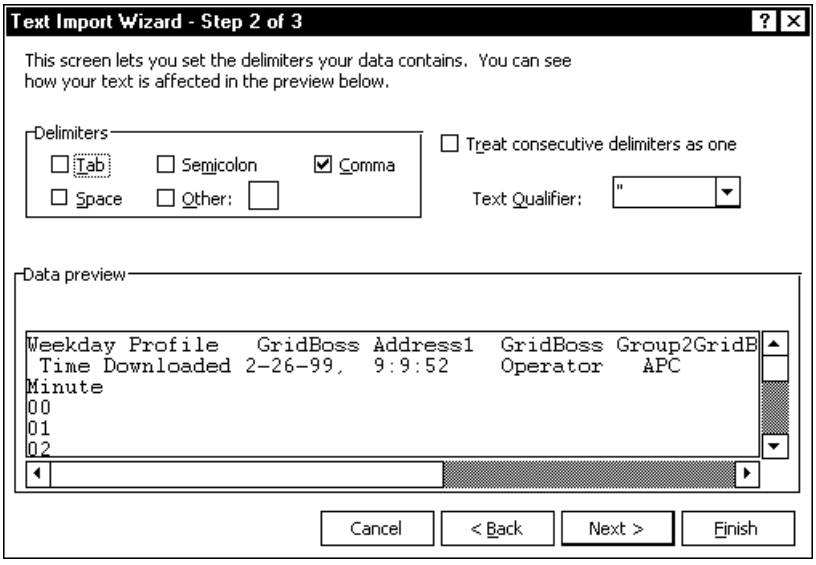

Figure 2-13. Excel .PRN Import 2 of 3

9. Select the **General** checkbox and click **Finish**. Refer to Figure 2-14.

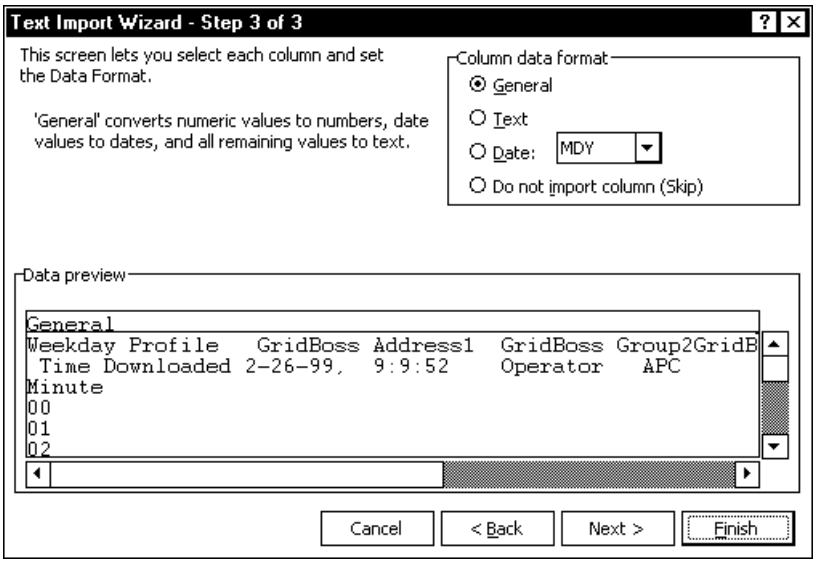

Figure 2-14. Excel .PRN Import 3 of 3

Figure 2-15 displays the .PRN file in Excel.

	A	B	C	D	E	F	G	H	I	J	K
1	Weekday Profile	GridBoss Address1	GridBoss Group2	GridBoss District R							
2	Time Downloaded 2-26-99, 9:9:52	Operator APC									
3	Minute	Setpoint Change									
4	0	0.011832									
5	1	0.011043									
6	2	0.010307									
7	3	0.01667									
8	4	0.013949									
9	5	0.013019									
10	6	0.012151									
11	7	0.011341									
12	8	0.017765									
13	9	0.014586									
14	10	0.013613									
15	11	0.012706									
16	12	0.011859									
17	13	0.018925									
18	14	0.01538									
19	15	0.014356									
20	16	0.013398									
21	17	0.012505									
22	18	0.019287									
23	19	0.015864									
24	20	0.014619									

Figure 2-15. TOD Profile in Excel

2.7.3 Events/Alarms

When you select Events/Alarms, the Collect GridBoss Data function saves all 240 events and 240 alarms. Events under are saved under the *FILENAME*.EVT and Alarms are saved under *FILENAME*.ALM.

2.7.4 History

After selecting Collect GridBoss Data from the File menu and selecting History, the Collect GridBoss Data function saves 15-minute and daily data for all parameters configured in the history database (up to 15). When you select History, the Save File dialog box displays as described previously. Change the current File Name or accept the default name and press OK.

Next, a dialog box for selecting the number of logs displays. Refer to Figure 2-16. Note that 840 logs are 96 15-minute logs stored each day times 8.75 days. If you wanted just the past 2 days of 15-minute history, you would multiply 96 times 2 to get 192 logs. Enter the number of logs you desire to collect and press OK.

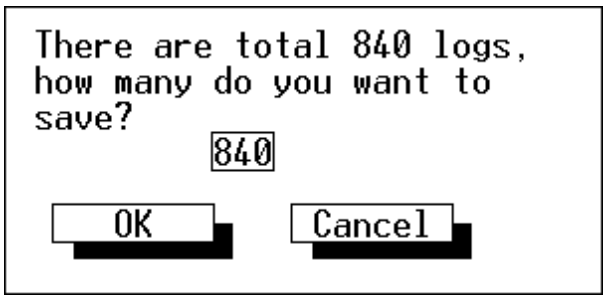

Figure 2-16. Select Number of Logs

2.8 DOWNLOAD…

Use Download... in the File menu to create a back up copy of the configuration for a GridBoss on a disk file, or to upload a configuration file to a GridBoss. The Download option allows you to download the configuration from a GridBoss unit to a disk file, or a disk configuration to a GridBoss.

After selecting Download from the File menu, a sub-menu displays:

- **GridBoss Config. to Disk** – Download the current GridBoss configuration to a disk file.
- **Disk Config. to GridBoss** – Upload a disk configuration to a GridBoss.
- **TOD Profiles** – Upload the time-of-day load profiles to a GB601 DR.

2.8.1 Save GridBoss Configuration to Disk

The GridBoss Config. to Disk option saves the current configuration of the connected GridBoss to a disk file.

1. Select **GridBoss Config. to Disk**. The Save File dialog box appears. Refer to Figure 2-6.
2. Type the **File Name** of the backup file or use the default name, which is based on the Group and Address of the device.
3. Press **OK**. A file with a `.GCF` extension is created in the default GRIDLINK directory. The default GRIDLINK directory is the directory from which you launched the GRIDLINK program.

The GridBoss Config. to Disk `.GCF` file contains the full configuration of the GridBoss, **except for any FSTs**. To save FSTs, you must use the FST Editor and save the FSTs to a disk file.

NOTE

Back up FSTs by using the Write FST function in the FST Editor.

This feature is especially useful when multiple GridBoss units requiring similar configurations are being configured for the first time, or when configuration changes need to be made off-line. The advantage of off-line configuration is the ability to perform most of the configuration without connecting to the GridBoss. This is also an advantage if you are modifying the configuration of an operating GridBoss, since it can minimize down time. Off-line configuration is performed by taking an existing configuration file, opening it, and making the desired changes.

Once a backup configuration file is created, it can be loaded into a GridBoss by using the Disk Config. to GridBoss function. GB601 District Regulator units can only load DR files, while GB602 Low Pressure Point units can only load LPP files.

2.8.2 Load Disk Configuration to GridBoss

The Disk Config. to GridBoss option loads GridBoss configuration data from a disk file into a connected GridBoss. This dialog box lists the configuration files with the `.GCF` located in the default GRIDLINK directory.

1. Select **Disk Config. to GridBoss** from the Download option located in the File menu. The Open File dialog box appears. Refer to Figure 2-8.
2. Select one of the listed files with a `.GCF` extension, or choose a different Drive/Directory that contains the desired configuration file.
3. Press **OK**.

   Another dialog box appears that lets you select various components of the configuration to be loaded into the GridBoss. Refer to Figure 2-17. The File Name of the configuration file is given at the top of the dialog box. Only the point types that are configured both in the GridBoss and in the disk file are selectable in the list.
4. By default, all components are selected; **if you do not disable any, all point types download and override the current configuration**. To deselect a component, such as System Variables, click on the "X" between the brackets in front of the component.

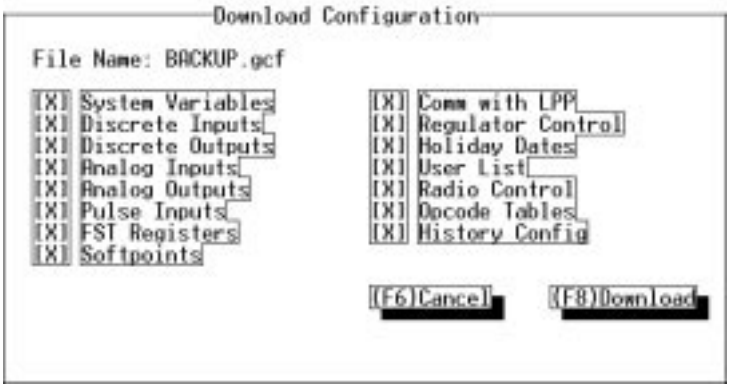

Figure 2-17. Disk Config. to GridBoss Selection for a District Regulator

5. When you are finished selecting components, press **(F8)Download**.

CAUTION

Counters, accumulators, and EU values are changed during a download if the current value is different from the value on the disk file. Make sure that any controlled process is safe from abrupt changes due to the downloaded configuration.

6. Keep in mind that FSTs are not part of the configuration file. Load any FSTs into the GridBoss by using the Read FST function in the FST Editor.

2.8.3 Load TOD Profiles

When using a District Regulator GB601 unit, this option loads **time-of-day load profiles** from a disk file into GB601 user memory. Select TOD Profiles from the File menu's Download option. When you select TOD Profiles, a display appears that allows you to download a Weekday Profile, a Weekend/Holiday Profile, or both. Refer to Figure 2-18.

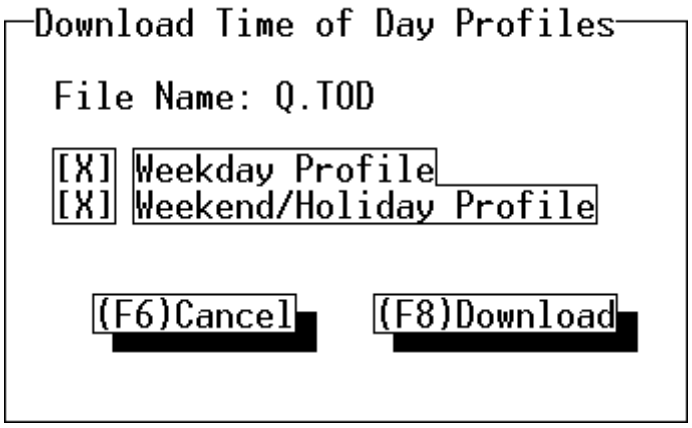

Figure 2-18. TOD Profiles

Time-of-day load profiles are used in the Adaptive control mode. A Weekday Profile has a lower load than a Weekend or Holiday Profile as less energy is consumed during the week while people are working.

Weekday Profile – Downloads time-of-day weekday profile.

Weekend/Holiday Profile – Downloads time-of-day weekend and associated holiday load profile.

2.9 UPDATE FIRMWARE

Use the Update Firmware option located under the File menu to update the internal software. Only the Flash ROM is upgraded during this procedure. This option does not update the GRIDLINK software but clears the Event Log and Alarm Log. Save the Event Log and Alarm Log to a file before proceeding; refer either to Save GridBoss Configuration to Disk on page 2-20, or to Event and Alarm History in Section 7.

You receive the updated firmware files on a disk. To install the file and update your firmware:

1. Create a backup copy of the GRIDLINK Update Firmware disk, as explained previously.
2. Perform a full backup before proceeding; refer to Save GridBoss Configuration to Disk on page 2-20.
3. Insert the Update Firmware disk in the 3.5-inch floppy drive.
4. Read the README file included on the Update Firmware disk.
5. Select Update Firmware from the File menu. The New or Existing Backup dialog box appears for specifying whether to create a new backup or use an existing file.

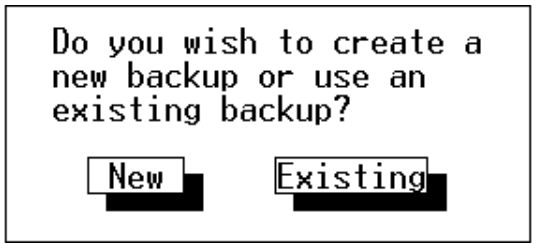

Figure 2-19. New or Existing Backup

6. Click **New** or **Existing**. When you create a New backup, the GridBoss reinstalls the current configuration of the device after the hardware is installed. If you choose Existing backup, the GridBoss reinstalls the configuration based on the last backup you created and does not return the GridBoss to its current state.

   The Open File dialog box appears for specifying a File Name to download. Refer to Figure 2-20. The Open File dialog displays the names of all files with the `.BIN` extension located in the default directory.

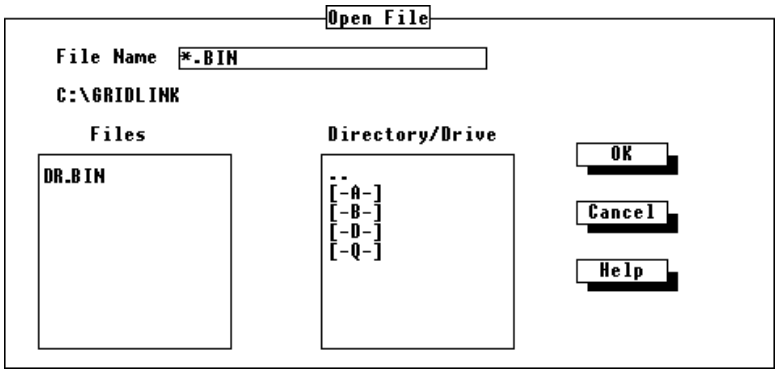

Figure 2-20. Update Firmware Open File Dialog

7. Navigate to the floppy disk drive location where the Update Firmware file is located. You can change the path to the directory containing the file using the Directory/Drive field.
8. Select the desired file from the Files list, which is the file on the floppy disk. **The file has a `.BIN` extension.** With the desired file highlighted, press OK.

The file begins loading, with the Status Line showing the progress in four categories: Segment, Address, Block Size, and Total Sent. The loading process may take several minutes depending on the firmware.

When loading is complete, the GridBoss re-reads its configuration and records the actions in the Event Log. While the memory is being modified, the I/O is not read, but is held at the last values. When installation is complete, press Enter.

2.10 UPDATE HARDWARE

Use Update Hardware under the File menu to make a major modification to the hardware of the GridBoss, such as replacing the motherboard, replacing the flash chip, replacing the entire GridBoss unit, or any other modification in which you are concerned that configuration will be lost. After selecting the Update Hardware option, backup files are created containing the GridBoss configuration, calibration, communications settings, GridBoss flags, and FSTs. Alarms, events, and history cannot be loaded back into the unit, if you require the information, be sure to save the logs to a file before proceeding. Refer to Section 2.7, Collect GridBoss Data, on page 2-14.

After backing up the information, you are prompted to power down the unit, make the hardware changes, power the unit back up, and then press Enter. At that time, the backup information is loaded into the GridBoss.

When loading of the files is complete, GRIDLINK re-connects to the GridBoss re-reads its configuration and records the actions in the Event Log.

To update your hardware:

1. Select **Update Hardware** from the File menu. Refer to Figure 2-21.

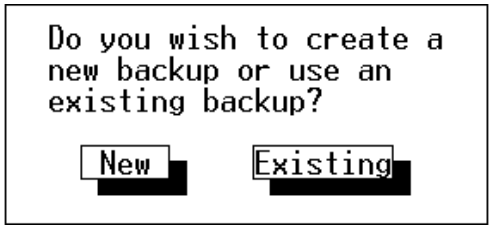

Figure 2-21. Update Hardware Backup

2. Click **New** or **Existing**. When you create a New backup, the GridBoss reinstalls the current configuration of the device after the hardware is installed. If you choose Existing backup, the GridBoss reinstalls the configuration based on the last backup you created and does not return the GridBoss to its current state.

   GRIDLINK automatically begins saving the hardware configuration.

File Grid I/O Data Display History Utilities System Help
Saving GridBoss configuration to disk.
Saving calibration and communications settings to disk.
Saving existing FSTs to disk.
Power down GridBoss, Replace Hardware, POWER UP GridBoss, press ENTER.
Backup of GridBoss completed.
Line:COM1

Figure 2-22. Saving Hardware Configuration

3. When prompted, **remove power** from the GridBoss.
4. Replace the **hardware**.
5. Reapply **power** to the GridBoss.
6. Press **Enter**. Refer to Figure 2-23.

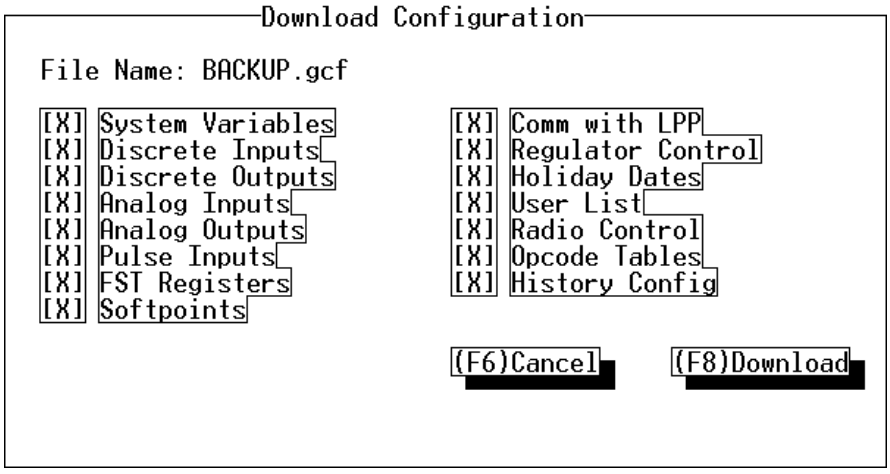

Figure 2-23. Configuration Selection for a District Regulator

By default, all components are selected; **if you do not disable any, all point types download and override the current configuration**. To deselect a component, such as System Variables, click on the "X" between the brackets in front of the component.

7. When you are done selecting components, press **(F8)Download**.

File Grid I/O Data Display History Utilities System Help
Saving GridBoss configuration to disk.
Saving calibration and communications settings to disk.
Saving existing FSIs to disk.
Power down GridBoss, Replace Hardware, POWER UP GridBoss, press ENTER.
Restoring existing FSIs to the GridBoss.
Restoring configuration to the GridBoss.
Restoring calibration and communications settings to the GridBoss.
GridBoss has been successfully upgraded, press ENTER to continue. On Line:COM1

Figure 2-24. Updating Hardware

The loading process may take several minutes depending on how large the backup configuration file is.

8. When loading is complete, the GridBoss re-reads its configuration and records the actions in the Event Log. While the memory is being modified, the I/O is not read, but is held at the last values. When installation is complete, press Enter.

2.11 CONVERT…

The Convert option converts the existing GridBoss history files to a spreadsheet format file for easy file exporting. Convert is located under the File menu.

The following categories of data logs can be converted into a spreadsheet format:

- Minute History File – extension `.MDB`
- 15-Minute History File – extension `.PDB`
- Daily History File – extension `.DAY`

When you select any of the previous options, the Open File dialog box (Figure 2-8) appears with a list of all applicable history files found in the default GRIDLINK directory. These files must have been created either by using the Collect GridBoss Data function or by using the Save function while viewing a history log. Select the desired log file.

Once a history file is selected, a new screen appears as shown in Figure 2-25. Select a conversion file format. There are four formats:

- **Tab** delimited spreadsheet – ASCII text
- **Comma** delimited spreadsheet – ASCII text
- **Space** delimited spreadsheet – ASCII text
- **Intellution Format** (15-minute or day history only)

Refer to Section 2.7.2.1, Viewing TOD Profiles, on page 2-16.

Figure 2-25. Convert

Select a format and press Start Converting. A Save File dialog box appears (refer to Figure 2-6) that lets you specify the File Name of the spreadsheet file and the intended location. Use the DOS naming conventions when naming your files. You may specify a file name with up to eight characters before the period and an extension with three characters after the period: for example, Convert2.txt or History2.txt. When you press OK, the file is created.

Start Converting — After selecting the type of conversion format, press Start Converting to convert the files.

Cancel — Press Cancel to exit the Conversion screen.

2.12 PRINT CONFIGURATION

Select the Print Configuration option in the File menu to print the current configuration to the default on-line printer. Refer to Figure 2-26.

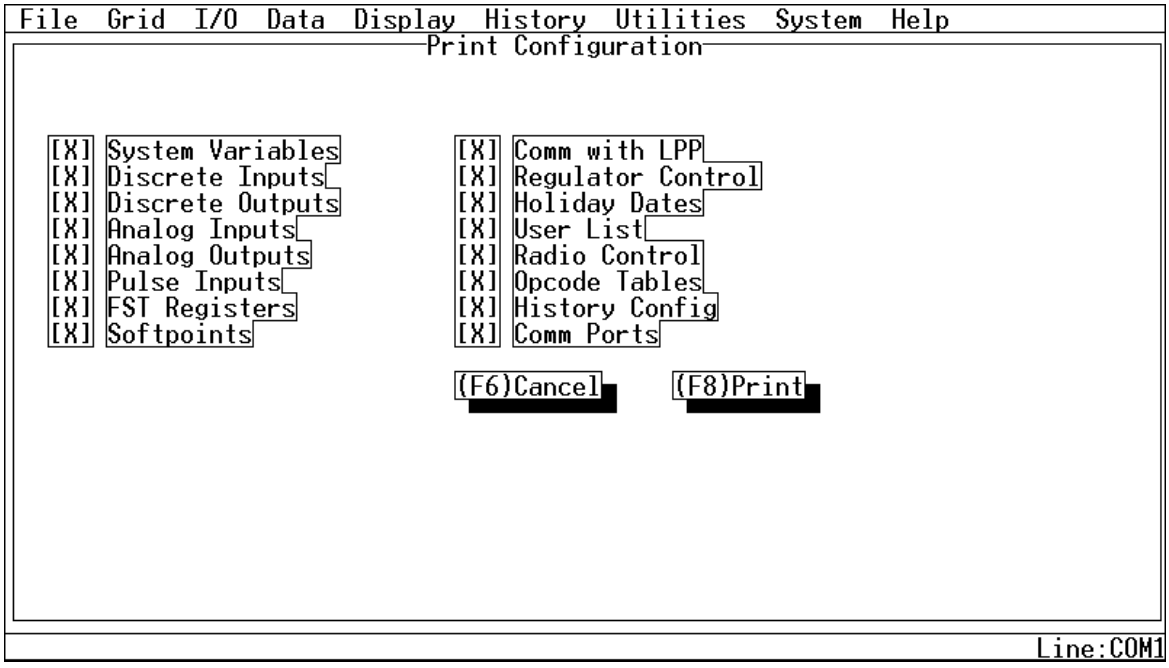

Figure 2-26. Print Configuration for GB601 DR Controller

Select the configuration variables you desire to print and press F8(Print) to print your selections.

NOTE

The printer must be a line printer. Print Configuration does not support PostScript printers.

2.13 GRIDLINK SECURITY

The GRIDLINK Security feature is **available from the initial File menu before you connect** to the GridBoss. Select the GRIDLINK Security option in the File menu to edit the log-ons of all users of the GRIDLINK software on this PC. In the screen that appears, you can specify the Operator ID, Password, and Level of up to 21 different users. Refer to Section 8 for more information.

2.14 MACROS…

The Macros… feature is **available from the initial File menu before you connect** to the GridBoss. Use macros to record a sequence of keystrokes that you perform. You can then replay the sequence of keystrokes on demand by using a "hot key" that you assign before recording the sequence of keystrokes. The macro options are:

- Record Macro
- Play Macro
- Stop Recording

Refer to Section 8 for detailed instructions on creating macros.

2.15 EXIT ALT+X

Select Exit under the File menu to exit the GRIDLINK program. If you are currently connected to a disk file, the file will be closed. If you are currently connected to a dial-up GridBoss, the hang-up command will be issued to the modem.

When you select **Exit**, the GRIDLINK software quits running and disappears from the screen. Alternately, you can use the **Alt + X** key combination when in the majority of screens to perform the same action.

SECTION 3 – THE GRID MENU

The Grid menu allows you to set up parameters that are used to communicate between the District Regulator (DR) controller and the Low Pressure Point (LPP) controller as well as to establish parameters for the control loops. The Grid menu is different for the DR and the LPP units. The following information is included in this section.

Information	Section	Page Number
Comm with LPP	3.1	3-2
RBX Alarm Options	3.1.1	3-4
Regulator Control	3.2	3-5
RBX Alarm Options	3.2.1	3-8
I/O Definitions	3.2.2	3-8
Tuning	3.2.3	3-10
Adaptive	3.2.4	3-13
Holiday Dates	3.3	3-15
Comm with DRs	3.4	3-16
DR Control Status	3.4.1	3-19
RBX Alarm Option	3.4.2	3-20
Low Pressure Control	3.5	3-21

3.1 COMM WITH LPP

When using a District Regulator Controller, select **Comm with LPP** under the Grid menu to display the **Communications with the LPP** screen. The Communications with the LPP screen is used to configure the LPP Tag (name), LPP Address, and LPP Group of the Low Pressure Point Controller assigned to control this District Regulator Controller.

The LPP controller can communicate with up to five DR units. Each DR contains information about the LPP that validates the communications between the DR and LPP.

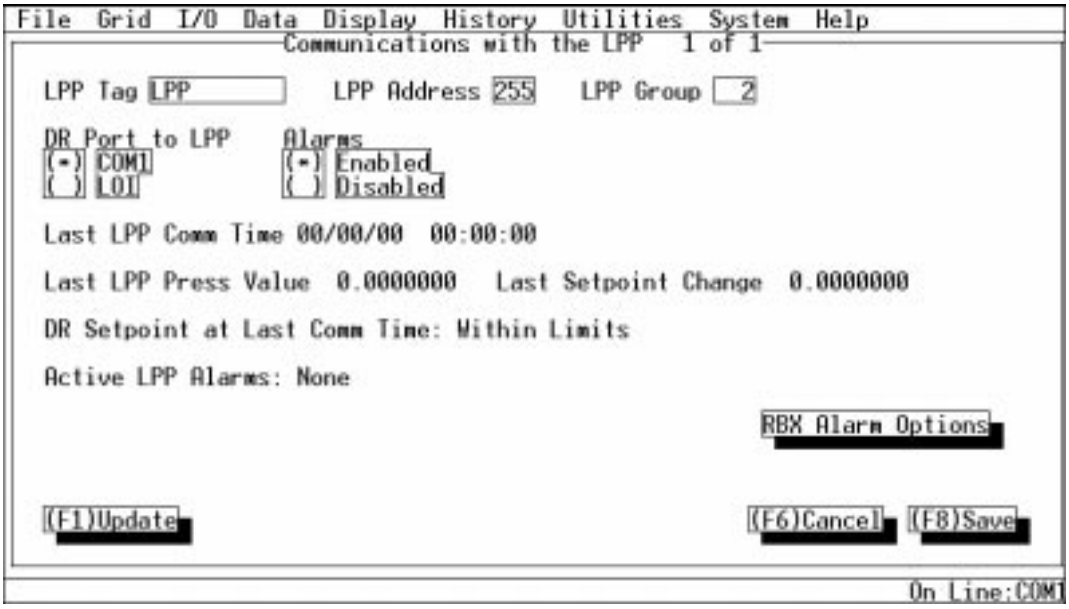

Figure 3-1. Comm with the LPP

LPP Tag — Name of the LPP assigned to control this DR. Enter up to 10 characters to identify the LPP being defined in this screen. Any alphanumeric characters, including spaces, may be used. The LPP Tag must be a unique value for each LPP Controller used in the system.

LPP Address — Address of the LPP. This is the LPP Address assigned to control this DR. The LPP Address must be a unique value for each LPP Controller used in the system. The default value is 200.

LPP Group — Group with which the LPP is associated and LPP Group assigned to control this DR. The default value is 2.

NOTE

If the LPP Address and LPP Group entered here do not match the DR Address and DR Group of the LPP that controls this DR, the DR ignores the commands.

DR Port to LPP — Select the communications port at the DR. This is the communications port the DR uses to communicate with the LPP. The default value is COM1.

Alarms — You can either enable or disable limit alarm logging for the Low Pressure Point controlling this DR. If you enable Alarms, the RBX Alarm Options pushbutton becomes active. The LPP Communications Fail alarm is the only alarm that can be logged to the Alarm Log. If you disable Alarms, no alarm logging is generated for this LPP, regardless of the alarm configuration. The default value is Enabled.

Last LPP Comm Time — Displays the last date and time the Low Pressure Point Controller had valid communications with this District Regulator.

Last LPP Press Value — Displays the last average low pressure for the minute (Avg. Low Press Value) point value read at the LPP.

Last Setpoint Change — Displays the last change in Setpoint received from the LPP.

DR Setpoint at Last Comm Time — Displays the state of the Setpoint and Control Output at the District Regulator Controller when the last communications with the LPP occurred.

- **Within Limits** – DR is within the Setpoint and Control Output limits.
- **Maximum Limit** – Setpoint or Control Output at maximum limit.
- **Minimum Limit** – Setpoint or Control Output at minimum limit.

Active LPP Alarms — This field indicates any alarms that are active from the LPP Controller. When alarming is Enabled, the limit alarms that are active appear. Even if the Alarms field is Disabled, all alarm indicators can still appear. You may see the following:

- **None** – No active alarms.
- **Low Bat** – Low battery alarm.
- **Pressure Xmit** – Low pressure transmitter point failure.
- **Comm Fail** – Communications failure.

3.1.1 RBX Alarm Options

Communications with the LPP can be tracked by the Host by sending a Report-by-Exception alarm to the Host when a set of conditions is met.

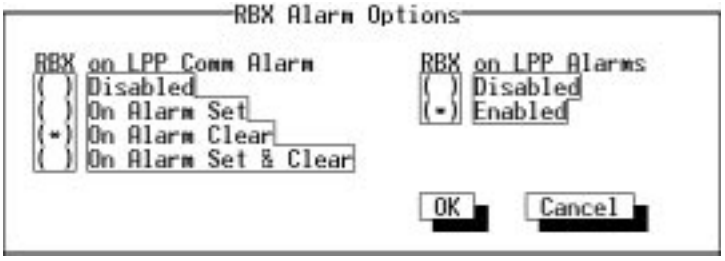

Figure 3-2. RBX Alarm Options

RBX on LPP Comm Alarm — Set the appropriate type of Report-by-Exception (RBX) alarm.

Disabled – Select Disabled to turn this option OFF. This is the default value.

On Alarm Set – When the LPP enters a communications alarm condition, the GridBoss generates a Report-by-Exception message to the Host.

On Alarm Clear – When the LPP leaves a communications alarm condition, the GridBoss generates a Report-by-Exception message to the Host.

On Alarm Set & Clear – In either condition, a Report-by-Exception message generates. Note that RBX alarming also requires the communications port to be properly configured. Select Disabled if you do not want RBX alarming to be active for this point.

RBX on LPP Alarms — Select Disabled or Enabled to allow Report-by-Exception (RBX) alarming when the Low Battery or Pressure Point Fail type of LPP alarm occurs. By default, RBX on LPP Alarms is Disabled.

After configuring a DR and pressing (F8)Save, use “Write to Internal Config Memory” in the GridBoss Flags display. This saves the configuration to programmable ROM in case you must perform a Cold Start. Refer to Section 9.

3.2 REGULATOR CONTROL

When using a District Regulator Controller, select **Regulator Control** under the Grid menu to display the screen that is used to setup the **Inner Loop**, tune the control loop, and establish necessary adaptive configuration parameters for **Adaptive** Predictive Control.

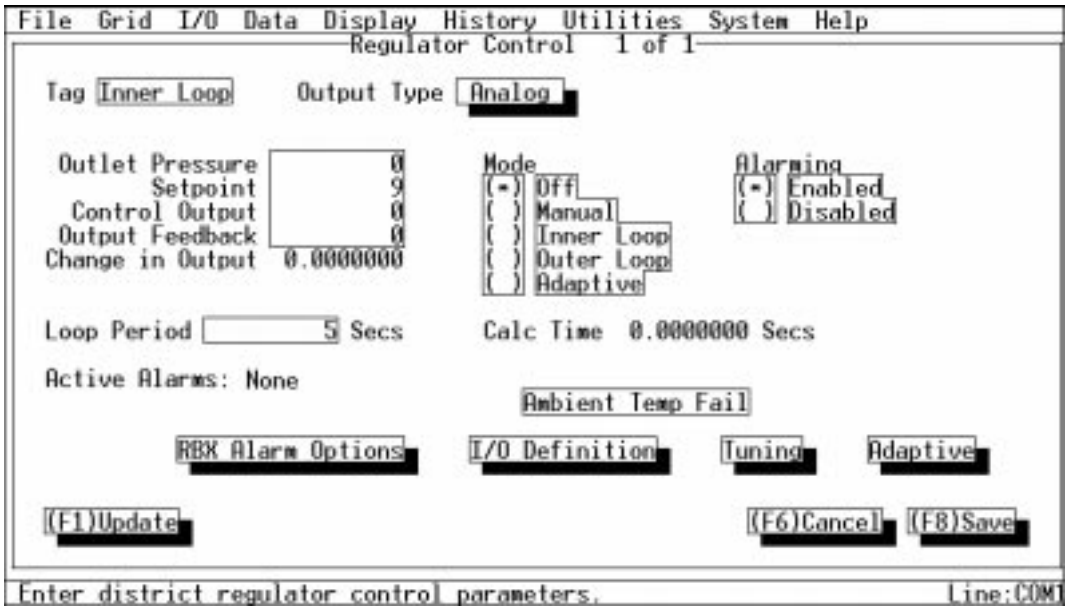

Figure 3-3. Comm with LPP – Regulator Control

Tag — Name of the Inner Control Loop you are configuring. Enter up to 10 characters to identify the control loop point being defined in this screen. Any alphanumeric characters, including spaces, may be used.

Output Type — The type of output that controls the Kixcel can be either an Analog Output (AO) or a Discrete Output (DO). If the Discrete Output is used, two DOs (Timed Duration Output – TDO) must be used. One DO is used to raise the Kixcel and the other is used to lower the Kixcel.

Outlet Pressure — The Outlet Pressure you are controlling at the District Regulator. This is the current value of the process variable, which is determined by the input definition (I/O Definition). The value is used for comparison to the Setpoint. The default value is 0.

Setpoint — The Setpoint around which the Outlet Pressure (process variable) is controlled. When in Manual Mode, you may enter a value to be in line with the Outlet Pressure so there is not a harsh bump at startup. The default value is 0.

Control Output — Desired output to the Kixcel, I/P, or servo valve. This can be an Analog Output or a Discrete Output. This should be the same value as the Output Feedback.

Output Feedback — Actual output of the Kixcel, I/P, or servo valve. This is the exact position of the Kixcel, I/P, or servo valve as returned by an Analog Input. This can only be used if the Output Type is an Analog Output.

Change in Output — This is the amount the control loop changed the output to the Kixcel in the last control calculation. For an Analog Output, the Change in Output is added to the current output. For a Discrete Output, this is the actual output applied to open the DO if it is positive or to close the DO if it is negative. The default value is 0.

Mode — The District Regulator controls the regulator Outlet Pressure by adjusting the output to the Kixcel in one of four modes using the GRIDLINK firmware. The four modes that can be enabled are:

- **Off** – Control processing does not occur if Off is selected.
- **Manual Mode** – Values in Manual Mode are manually manipulated and do not include information from either the District Regulator or the Low Pressure Point. This is the default Mode.
- **Inner Loop Mode** – Inner Loop Mode includes only information from the District Regulator and the Kixcel. Information from the Low Pressure Point is not included. Refer to Section 3.2.3, Tuning, on page 3-10.
- **Outer Loop Mode** – Outer Loop Mode includes both information from the District Regulator and the Low Pressure Point. Outer Loop Mode allows the LPP to control the Inner Loop Setpoint. An adaptive temperature coefficient and time-of-day profile are being calculated, but are not used for control loop processing.
- **Adaptive Mode** – Adaptive Mode includes both information from the District Regulator and the Low Pressure Point; in addition, biases based on the time-of-day and temperature load profiles are also calculated and are used for control. This pattern reduces the need for the LPP to continually call the DR. Refer to Section 3.2.4, Adaptive, on page 3-13.

NOTE

When in Manual Mode and Inner Loop Mode, the LPP does not communicate with that DR again until the value entered in the Error Time Delay for DRs field has been met. After the Error Time Delay period, the LPP communicates with the DR to determine if it is in Outer Loop Mode or Adaptive Mode.

Refer to the *GridBoss Instruction Manual (Form A6074)* for details concerning Control Modes.

Alarming — You can either enable or disable alarm logging for the Output Monitor Fail alarm. If you enable Alarms, the RBX Alarm Options pushbutton becomes active. The Output Monitor Fail alarm is the only alarm logged to the Alarm Log. If you disable Alarms, no alarm logging is generated for this regulator, regardless of the Alarm configuration. The default value is Enabled.

Loop Period — The amount of time desired between control loop calculations in seconds. The default value is 5 seconds to ensure that an updated Output Pressure (process variable) is received for each control loop calculation. The Loop Period cannot be less than 1 second.

Calc Time — This indicates the actual period of time (in seconds) between executions of the control loop algorithm and is the amount of time measured between executions from the beginning of one execution to the beginning of the next.

Active Alarms — This field indicates any alarms that are active for the control process. Alarms include:

- **None** – No Active Alarms.
- **Output Monitor Fail** – Output Feedback exceeds Output Deviation Deadband for Control Output.
- **DR Low Battery** – Low battery alarm.
- **DR Outlet Press Fail** – Outlet Pressure transmitter point failure.
- **Ambient Temp Fail** – Temperature transmitter point failure.

Alarm Options — Refer to page 3-8.

I/O Definitions — Refer to page 3-8.

Tuning — Refer to page 3-10.

Adaptive — Refer to page 3-13.

After configuring a DR and pressing (F8)Save, use “Write to Internal Config Memory” in the GridBoss Flags display. This saves the configuration to programmable ROM in case you must perform a Cold Start. Refer to Section 9.

3.2.1 RBX Alarm Options

The output deviation at the DR can be tracked by the Host by sending a Report-by-Exception alarm to the Host when an Output Monitor Fail alarm occurs or clears. The Output Feedback and the actual output sent must be within the Output Deviation Deadband or an Output Monitor Fail alarm occurs which triggers the RBX Alarm.

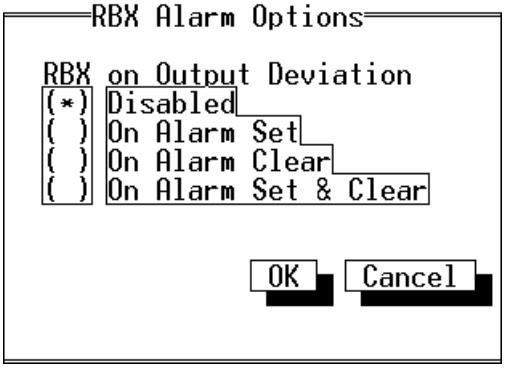

Figure 3-4. Alarm Options

RBX on Output Deviation — Function to carry out when a deviation in the expected output occurs.

Disabled – Select Disabled to turn this option OFF.

On Alarm Set – When the DR Output Monitor enters an alarm condition, the GridBoss generates a Report-by-Exception message to the Host.

On Alarm Clear – When the DR Output Monitor leaves an alarm condition, the GridBoss generates a Report-by-Exception message to the Host.

On Alarm Set & Clear – In either condition, a Report-by-Exception message generates. Note that RBX alarming also requires the communications port to be properly configured. Select Disabled if you do not want RBX alarming to be active for this point.

3.2.2 I/O Definitions

Use the I/O Definitions pushbutton to select the type of input or output (I/O) desired for the control loop.

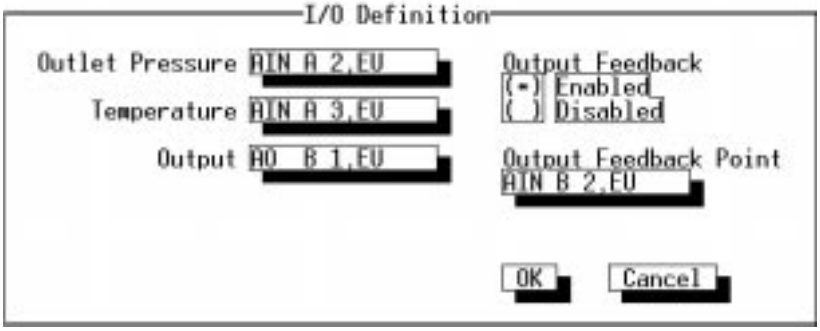

Figure 3-5. I/O Definition for Analog Output

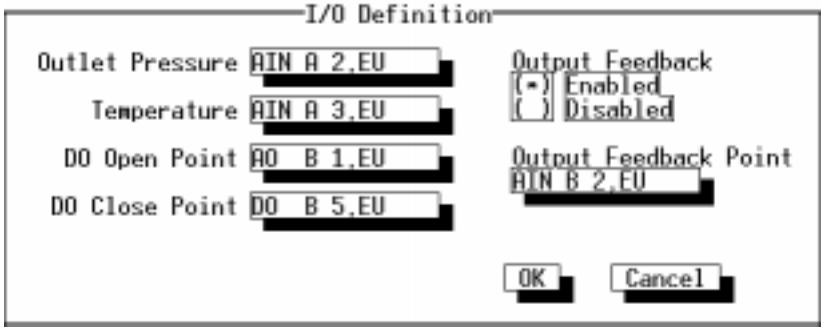

Figure 3-6. I/O Point Definition for Discrete Output

Click the I/O Definitions pushbuttons to select the point type for the option. Refer to Figure 3-7.

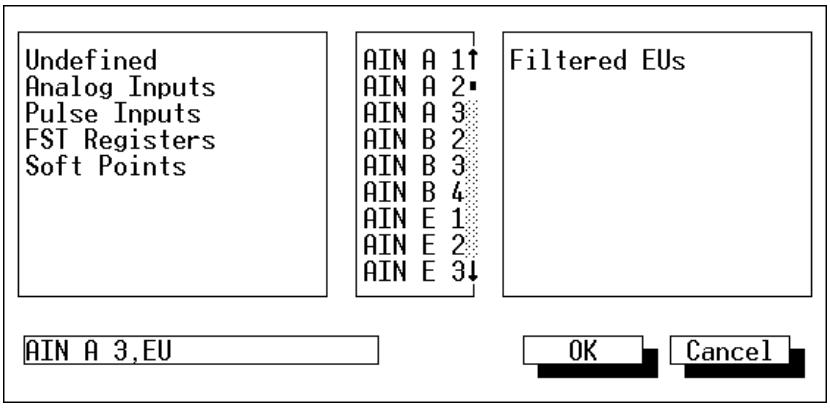

Figure 3-7. I/O Point Definition Example for Analog Inputs

To use the point definition dialog box, first determine the point type to use as an input or output by highlighting it in the left-most scrollable list.

Next, in the middle scrollable list, select the exact point type location, parameter, or logical number. For example, for an Analog Output point type you might select AO B 1.

Finally, in the right-most scrollable list, choose the specific parameter to use. For an Analog Input, this would typically be Filtered EUs.

Outlet Pressure — Point type used by the Outlet Pressure (process variable). The default value is Analog Input Point Number A2.

Temperature — Point type used by the RTD to acquire the ambient Temperature. The default value is Analog Input Point Number A3.

Output — Point type used by the Control Output when using an Analog Output. The default value is Analog Output Point Number B1.

DO Open Point — Point type used by the Control Output to open the output when using a Discrete Output.

DO Close Point — Point type used by the Control Output to close the output when using a Discrete Output.

Output Feedback — Select Enabled to allow the Kixcel, I/P, or servo valve to send the exact location of the Kixcel back to the District Regulator when using an Analog Input (AI).

Output Feedback Point — Point type used by the AI Output Feedback Point if Output Feedback is Enabled. The default value is Analog Input Point Number B2.

3.2.3 Tuning

The Inner Loop control PID is configured using the Tuning screen.

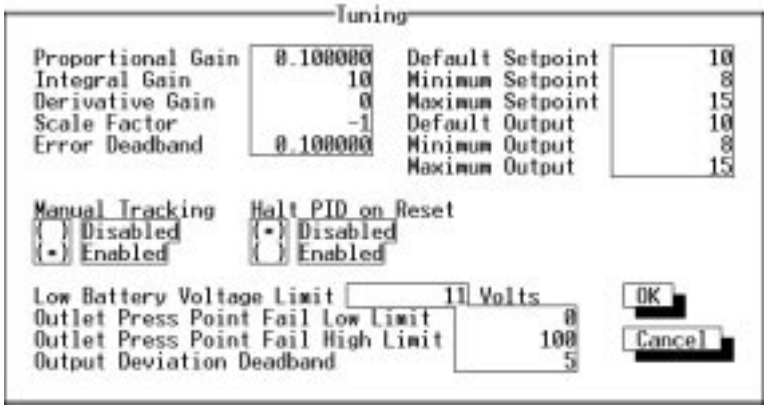

Figure 3-8. Tuning for Analog Output Type

Proportional Gain — Proportional Gain is the ratio of the change in output to the change in input (Outlet Pressure), based on the control action in which there is a continuous linear relationship between the output and input. An initial Proportional Gain setting of 0.01 is recommended to avoid loop instability. The default value is 0.01

Integral Gain — Integral Gain is the ratio of the change in output to the change in input (Outlet Pressure), based on control action in which the output is proportional to the time integral of the input. An initial Integral Gain setting of 10 is recommended to avoid loop instability. This value is in terms of repeats per minute. The default value is 10.

Derivative Gain — Derivative Gain is the ratio of the change in output to the change in input (Outlet Pressure), based on control action in which the output is proportional to the rate of change of the input. An initial Derivative Gain setting of 0 is recommended to avoid loop instability. The default value is 0.

Scale Factor — A number representing the ratio of the output span to input (Outlet Pressure) span. The sign of the number specifies the action of the loop: negative for reverse action (the default), or positive for direct action. Reverse action causes the control loop point to produce a "decrease" in output (to close a valve, for example) when the Outlet Pressure exceeds the Setpoint. The default value is -1.

Error Deadband — A "window" around the Setpoint. If the difference between the Outlet Pressure (process variable) and Setpoint is greater than the Error Deadband, a change in output is calculated. For example, if you enter "5," there will be a region of 5 units above and 5 units below the Setpoint in which the Outlet Pressure can move without affecting the output. The default value is 0.10, but should not be less than the accuracy of the pressure transmitter as this causes excessive wear on the output actuator.

Default Setpoint — This is the default Inner Loop control Setpoint that is used when an alarm condition terminates the Outer Loop or the Adaptive Mode and places the Control loop back to Inner Loop Mode. The Inner Loop then uses the Default Setpoint value. The Default Setpoint is also used if the LPP communicates to the DR that the LPP has a problem (such as a low battery error or pressure transmitter failure message) or if the LPP fails to call the DR for a period of 9 hours. If the Default Setpoint is less than zero, then the Setpoint remains at its current value. The default value is 10.

Minimum Setpoint — The Minimum Setpoint to which the Outer Loop can change the Setpoint. The default value is 8.

Maximum Setpoint — The Maximum Setpoint to which the Outer Loop can change the Setpoint. The default value is 15.

Default Output — The Inner Loop's default Kixcel position entry. If the DR has a low battery alarm or the Outlet Pressure transducer produces an equipment failure alarm, the control loop shifts to Manual Mode, and the Kixcel moves to the Default Output position. The default value is 10.

Minimum Output — The minimum Control Output, to which the Inner Loop's calculated output can fall. The default value is 8.

Maximum Output — The maximum Control Output, to which the Inner Loop's calculated output can not exceed. The default value is 15.

Manual Tracking — When the control Mode is shifted from Manual to Inner Loop, Outer Loop, or Adaptive Mode, the Manual Tracking can change the Inner Loop Setpoint. If Manual Tracking is enabled when shifting out of Manual Mode, the Inner Loop Setpoint changes to the current Outlet Pressure. This avoids an inadvertent bump in pressure. If Manual Tracking is disabled when shifting out of Manual Mode, the Inner Loop Setpoint remains unchanged.

Halt PID on Reset — Select Enabled to stop PID control actions when the GridBoss is reset. Values remain at their last known value.

Low Battery Voltage Limit — The lowest voltage that the battery can reach before generating a low battery alarm. When the Low Battery Voltage Limit drops below the value entered in this field, the control Mode shifts to Manual Mode and the Default Output value is used for the Kixcel position. With or without alarms enabled, this can cause the Mode to shift to Manual if the limit is violated. The default value is 11 volts.

Outlet Press Point Fail Low Limit — The lowest pressure that the Inner Loop Outlet Pressure can reach before generating an alarm. When the Outlet Press Point Fail Low Limit drops below the value entered in this field, the control Mode shifts to Manual Mode and the Default Output value is used for the Kixcel position. With or without alarms enabled, this can cause the Mode to shift to Manual if the limit is violated. The default value is 0.

Outlet Press Point Fail High Limit — The highest pressure that the Inner Loop Outlet Pressure can reach before generating an alarm. When the Outlet Press Point Fail High Limit exceeds the value entered in this field, the control Mode shifts to Manual Mode and the Default Output value is used for the Kixcel position. With or without alarms enabled, this can cause the Mode to shift to Manual if the limit is violated. The default value is 100.

NOTE

The Low Battery Voltage Limit (AI point number E1) and the Outlet Press Point Fail Low and High Limits (AI point number A2) can be set to send RBX alarms using the AI point Alarming options. The alarms should be set slightly beyond the range of the transducers. If a pressure transducer electrically shorts or opens, the signal goes beyond the 4 to 20mA range and triggers the RBX alarms.

Output Deviation Deadband — Analog Output Type only. A "window" around the Control Output. When the Control Output and Output Feedback are within this window from each other, alarming on Output Deviation is disabled. For example, if you enter "5," there will be a region of 5 units above and 5 units below the Control Output in which the Output Feedback can move without causing an alarm. The default value is 5.

3.2.4 Adaptive

When using a District Regulator Controller, use the parameters in this screen to setup the Adaptive Gain configuration required for using the Adaptive Mode control.

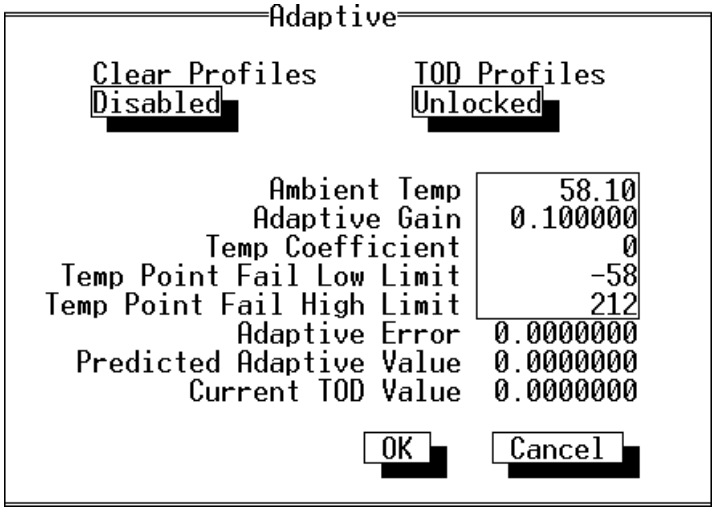

Figure 3-9. Adaptive

Clear Profiles — Historical time-of-day load profiles can be cleared if this parameter is Enabled. If the time-of-day profiles have been cleared, then the DR creates new time-of-day profiles. When in Outer Loop Mode, the time-of-day profiles are calculated based on the running average of the calculated change in Setpoint and the current time-of-day profile. Enabled causes the time-of-day profiles to clear and the Clear Profiles pushbutton returns to Disabled on the next screen update. The default value is Disabled.

TOD Profiles — After TOD Profiles have been created, the TOD Profiles parameter can be Locked to prevent the DR from generating, storing, and overwriting the TOD load profiles. The default value is Unlocked.

Ambient Temp — The current outside ambient temperature. The ambient temperature is updated once a minute. The default value is 0.

Adaptive Gain — This is a multiplier used to adjust the rate at which the system temperature coefficient is learned. The value should never be larger than 1.0. The default value is 0.10.

Temp Coefficient — The DR temperature is stored in a temperature profile, which modifies a temperature coefficient every minute. In addition, the temperature profile does not calculate a new coefficient when the Inner Loop Control Output or Setpoint is against either limit. The default value is 0.

Temp Point Fail Low Limit — The lowest temperature that the ambient temperature (Ambient Temp) can reach before generating an alarm. The control Mode shifts from Adaptive Mode to Outer Loop Mode if the temperature sensor violates the limits. Even if alarms are disabled, violating this limit causes Adaptive Mode to shift to Outer Loop Mode. The default value is -58 degrees F.

Temp Point Fail High Limit — The highest temperature that the ambient temperature (Ambient Temp) can reach before generating an alarm. The control Mode shifts from Adaptive Mode to Outer Loop Mode if the temperature sensor violates the limits. Even if alarms are disabled, violating this limit causes Adaptive Mode to shift to Outer Loop Mode. The default value is 212 degrees F.

Adaptive Error — The change in temperature and the temperature coefficient are used to predict a change in pressure. The difference between the predicted and measured pressure change is the Adaptive Error. The Adaptive Error and the Adaptive Gain are used to adjust the adaptive temperature coefficient. The ambient temperature and temperature coefficient are calculated once per minute.

Predicted Adaptive Value — The change in pressure that has been calculated from the adaptive temperature coefficient and the temperature change. If in Adaptive Mode, this value is added to the Inner Loop Setpoint every minute along with any change in Inner Loop Setpoint from the LPP. The ambient temperature and temperature coefficient are calculated once per minute.

Current TOD Value — The current time-of-day value being used by the DR. From the time-of-day and temperature profile, a Predicted Adaptive Value and a Current Time-of-Day Value can be calculated. If in Adaptive Mode, these values are added to the Inner Loop Setpoint every minute along with any change in Inner Loop Setpoint from the LPP.

3.3 HOLIDAY DATES

When using a District Regulator Controller, use the parameters in this screen to setup Holidays. One of the time-of-day profiles is for weekends (Saturday and Sunday) and holidays while the other is for weekdays. You may specify up to 30 holiday dates (month, day, and year). Use the (F2)Next and (F3)Prev keys to display each set of Holiday Dates.

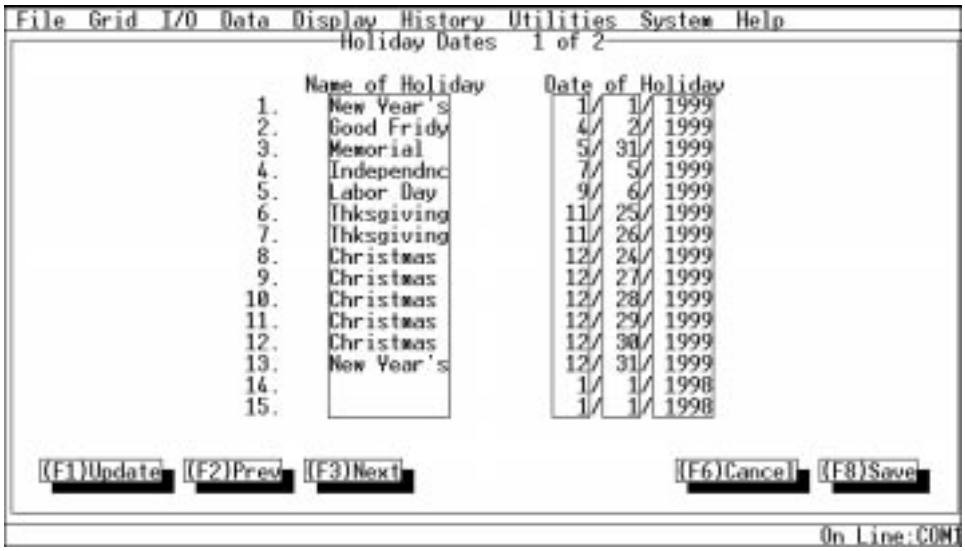
File Grid I/O Data Display History Utilities System Help
Holiday Dates 1 of 2
Name of Holiday
Date of Holiday
1. New Year's 1/ 1/ 1999
2. Good Fridy 4/ 2/ 1999
3. Memorial 5/ 31/ 1999
4. Independnc 7/ 5/ 1999
5. Labor Day 9/ 6/ 1999
6. Thksgiving 11/ 25/ 1999
7. Thksgiving 11/ 26/ 1999
8. Christmas 12/ 24/ 1999
9. Christmas 12/ 27/ 1999
10. Christmas 12/ 28/ 1999
11. Christmas 12/ 29/ 1999
12. Christmas 12/ 30/ 1999
13. New Year's 12/ 31/ 1999
14. 1/ 1/ 1998
15. 1/ 1/ 1998
(F1)Update
(F2)Prev
(F3)Next
(F6)Cance
(F8)Save
On Line:CONT

Figure 3-10. Holiday Dates

Time-of-day load profiles are used in Adaptive control Mode. A Weekday Profile has a lower load than a Weekend or Holiday Profile as typically less energy is consumed during the week while people are working.

Name of Holiday — The name of the holiday.

Date of Holiday — Date(s) on which the holiday occurs. Notice certain holidays such as Christmas span multiple days.

After configuring a DR and pressing (F8)Save, use "Write to Internal Config Memory" in the GridBoss Flags display. This saves the configuration to programmable ROM in case you must perform a Cold Start. Refer to Section 9.

3.4 COMM WITH DRS

When using a Low Pressure Point Controller, use the parameters in this screen to setup information concerning the DRs with which the LPP communicates. Some of these parameters include: the DR Tag (name), DR Address, DR Group, and telephone number of the LPP. Refer to Figure 3-11. A LPP Controller can communicate with up to five District Regulator units and each DR must be configured. Use the (F2)Next and (F3)Prev keys to display each DR.

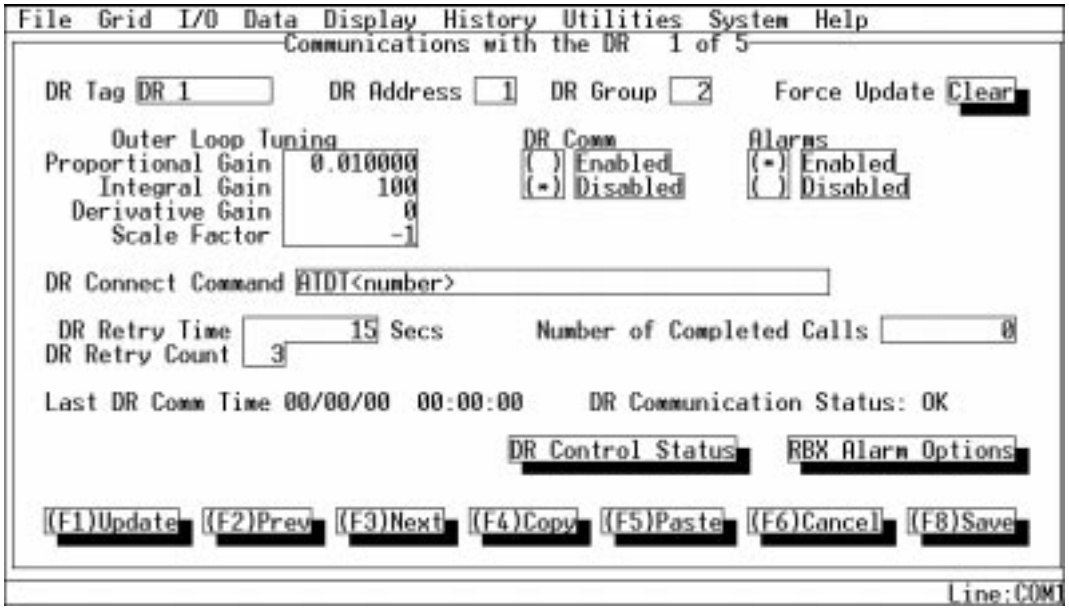

Figure 3-11. Comm with DRs

DR Tag — Name of the District Regulator Controller with which you desire to communicate. Enter up to 10 characters to identify the DR being defined in this screen. Any alphanumeric characters, including spaces, may be used. Each DR Tag must be unique for each District Regulator with which you are communicating.

DR Address — Address of the District Regulator Controller with which you desire to communicate.

DR Group — Group with which the District Regulator Controller is associated and with which you desire to communicate. The default value is 2.

Force Update — To force the LPP to communicate with the currently selected DR, press the Force Update pushbutton to Set, and press (F8)Save. If Force Update is Set and the DR is enabled for communications, the LPP attempts to communicate with the DR.

Outer Loop Tuning — Outer Loop Tuning is defined with a cascade PID control of the regulator Outlet Pressure with the Setpoint calculated from a PID loop controlling the Low Pressure Point (LPP).

- **Proportional** – Proportional gain is the ratio of the change in output to the change in input, based on the control action in which there is a continuous linear relationship between the output and input. An initial Proportional gain setting of 0.01 is recommended to avoid loop instability. The default value is 0.01.
- **Integral** – Integral gain is the ratio of the change in output to the change in input, based on control action in which the output is proportional to the time integral of the input. An initial Integral gain setting of 100 is recommended to avoid loop instability. This value is in terms of repeats per minute. The default value is 100.
- **Derivative** – Derivative gain is the ratio of the change in output to the change in input, based on the control action in which the output is proportional to the rate of change of the input. An initial Derivative gain setting of 0 is recommended to avoid loop instability. The default value is 0.

Scale Factor — A number representing the ratio of the output span to input span. The sign of the number specifies the action of the loop: negative for reverse action (the default), or positive for direct action. Reverse action causes the PID loop point to produce a "decrease" in output (to close a valve, for example) when the Low Pressure Value process variable exceeds the Setpoint.

DR Comm — Enable or disable communications with the currently selected District Regulator.

Alarms — You can either enable or disable alarm logging for communications between the LPP and the currently selected DR. If you enable Alarms, the RBX Alarm Options pushbutton becomes active. Alarms are also logged to the Alarm Log. If you disable Alarms, no alarm logging is generated for this LPP, regardless of the Alarm configuration. The default value is Enabled.

DR Connect Command — This command provides the modem with a telephone number to dial out and is the telephone number of the DR with which you desire to communicate.

A typical command for AT command set modems is shown in the following example. Refer to the modem manufacturer's instructions for more information.

Dial Command `ATDT 18005151212`

where: `ATDx` = dial the number 1-800-515-1212
`T` = tone dialing

NOTE

The telephone numbers must include the exact sequence required at the PC. In certain cases, access numbers such as (9) and area codes (1-212) may be required.

DR Retry Time — This is the actual amount of time the GridBoss firmware waits between retries when attempting to communicate through a Comm Port with a District Regulator Controller. **The default time-out is 15 seconds, but this can be increased if you are having difficulties communicating with your District Regulator.** The communications port requires at least a 0.25-second timeout. The minimum DR Retry Time is 1 second. Do not enter 0 (zero) in the DR Retry Time field.

DR Retry Count — This parameter (default is 3) can be set to control the number of times after the initial try that the GridBoss firmware attempts to establish communications with the specified DR before reporting a timeout error. The amount of time between retries can be adjusted by using the DR Retry Time parameter. **Adjust the DR Retry Count value up if you are having trouble communicating with your DR**.

After the DR Retry Count has been exhausted, the LPP generates the DR communications failure alarm and waits for the Error Time Delay to expire before trying to communicate with that DR again.

Number of Completed Calls — Number of valid communications between the DR and the LPP. The default value is 0.

Last DR Comm Time — Displays the last date and time the Low Pressure Point Controller had communications with the currently selected District Regulator.

DR Communication Status — Displays the status of the last communications between the District Regulator and the Low Pressure Point Controller. The default value is OK.

DR Control Status — Refer to page 3-19.

RBX Alarm Options — Refer to page 3-20.

After configuring an LPP and pressing (F8)Save, use “Write to Internal Config Memory” in the GridBoss Flags display. This saves the configuration to programmable ROM in case you must perform a Cold Start. Refer to Section 9.

3.4.1 DR Control Status

The DR Control Status dialog displays the current status of the currently selected District Regulator Controller.

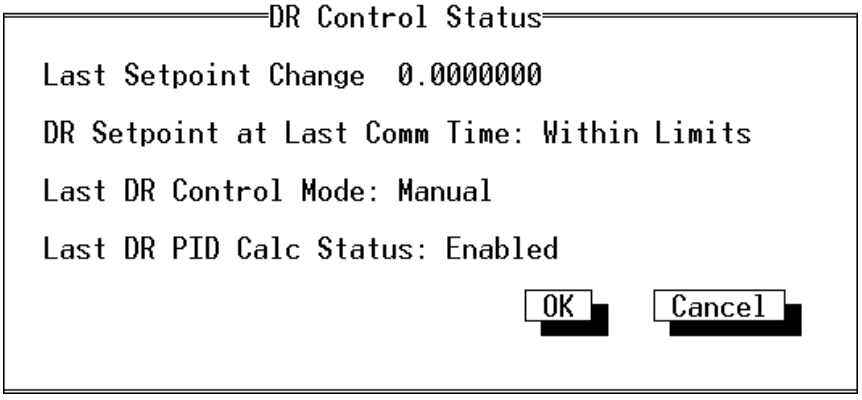
DR Control Status
Last Setpoint Change 0.0000000
DR Setpoint at Last Comm Time: Within Limits
Last DR Control Mode: Manual
Last DR PID Calc Status: Enabled
OK
Cancel

Figure 3-12. DR Control Status

Last Setpoint Change — Value of the last change in the Setpoint sent to the District Regulator.

DR Setpoint at Last Comm Time — Status of the District Regulator Setpoint or Control Output during the last communications with the LPP. This field also tracks the Control Output. If neither the District Regulator Setpoint or Control Output is at a limiting value, this field states the situation. If neither the District Regulator Setpoint or Control Output is against a limit, Within Limits displays.

- **Within Limits** – DR is within the Setpoint or Control Output limits.
- **Maximum Limit** – Setpoint or Control Output at maximum limit.
- **Minimum Limit** – Setpoint or Control Output at minimum limit.

Last DR Control Mode — The last control Mode in which the DR was operating.

- Manual.
- Inner Loop.
- Outer Loop.
- Adaptive.

Last DR PID Calc Status — Displays if the DR control loop calculation was Enabled or Disabled.

3.4.2 RBX Alarm Option

The RBX Alarm Options dialog enables you to set the RBX alarming options. When set, the LPP generates an RBX alarm to the Host when communication alarms occur between the LPP and the DR.

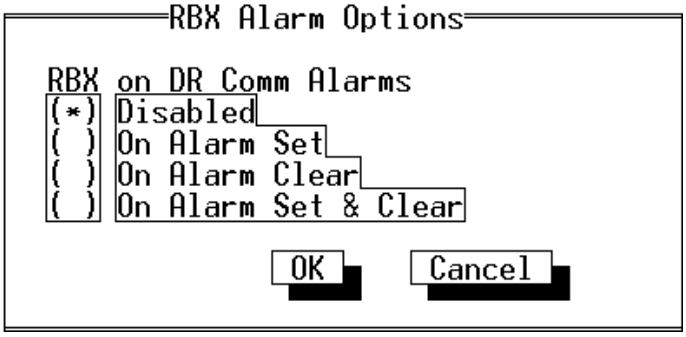

Figure 3-13. RBX Alarm Options

RBX on DR Comm Alarms — Set the appropriate type of Report-by-Exception (RBX) alarm for the District Regulator communications alarm.

Disabled – Select Disabled to turn this option OFF.

On Alarm Set – When the DR communication point enters an alarm condition, the LPP Controller generates a Report-by-Exception message to the Host.

On Alarm Clear – When the DR communication point leaves an alarm condition, the LPP Controller generates a Report-by-Exception message to the Host.

On Alarm Set & Clear – In either condition, a Report-by-Exception message generates. Note that RBX alarming also requires the communications port to be properly configured for the Host. Select Disabled if you do not want RBX alarming to be active for this point.

3.5 LOW PRESSURE CONTROL

When using a Low Pressure Point Controller, use the parameters in this screen to setup the **Outer Loop**.

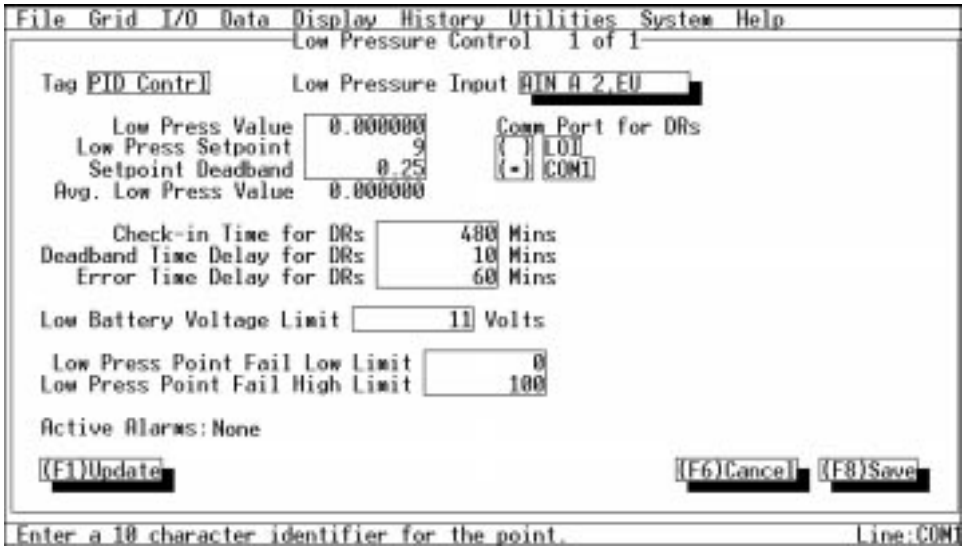
File Grid I/O Data Display History Utilities System Help
Low Pressure Control 1 of 1
Tag PID Contrl
Low Pressure Input AIN A 2.EU
Low Press Value 0.000000
Low Press Setpoint 9
Setpoint Deadband 0.25
Avg. Low Press Value 0.000000
Comm Port for DRs
( ) LOI
(•) COM1
Check-in Time for DRs 480 Mins
Deadband Time Delay for DRs 10 Mins
Error Time Delay for DRs 60 Mins
Low Battery Voltage Limit 11 Volts
Low Press Point Fail Low Limit 0
Low Press Point Fail High Limit 100
Active Alarms: None
(F1)Update
(F6)Cancel
(F8)Save
Enter a 10 character identifier for the point.
Line:COM1

Figure 3-14. Low Pressure Control

Tag — Name of the control loop at the LPP you are configuring. Enter up to 10 characters to identify the control loop point being defined in this screen. Any alphanumeric characters, including spaces, may be used. The default value is PID Contrl.

Low Pressure Input — Analog Input point used by the Low Press Value (process variable). Refer to Section 3.2.2, I/O Definitions, on page 3-8. The default value is Analog Input point number A2.

Low Press Value — The pressure you are monitoring at the low pressure point in the distribution system. This is the current value of the process variable, which is determined by the input definition (I/O Definition). The default value is 0.

Low Press Setpoint — The Setpoint around which the Low Press Value (process variable) is controlled. The default value is 9.0.

Setpoint Deadband — A "window" around the Low Press Setpoint. When the Avg. Low Press Value is within this window alarming does not occur. For example, if you enter ".5," there will be a region of .5 units above and .5 units below the Low Press Setpoint in which the Avg. Low Press Value can move without causing an alarm. The LPP calculates the input pressure average over a minute and compares it to the Setpoint. The default value is .25.

Avg. Low Press Value — The Average Low Pressure Value over the last minute. The LPP sends the change in Inner Loop Low Press Setpoint and the Avg. Low Press Value to the DR when the LPP average pressure for the minute is outside of the low pressure Setpoint Deadband. The default value is 0.

Comm Port for DRs — Select the communications port at the LPP. This is the communications port the LPP uses to communicate with all District Regulators. The default value is COM1.

Check-in Time for DRs — Enter a value in minutes that determines how often the LPP communicates with the District Regulators. The maximum value is 8 hours (480 minutes) and the minimum time is 1 minute. **The Check-in Time for DRs should always be greater than the Error Time Delay for DRs.** The default value is 480 minutes. If the LPP does not call the DR every 9 hours, the DR shifts from Adaptive or Outer Loop Mode to Inner Loop Mode and the Kixcel is set to the Inner Loop's Default Setpoint.

Deadband Time Delay for DRs — Enter a value in minutes that determines how long to wait after the average pressure for the minute has been outside of the Setpoint Deadband at the LPP. Once this time is expired, the LPP begins checking the average pressure for the minute versus the Setpoint Deadband again. The default value is 10 minutes.

When the pressure at the LPP goes out of the Setpoint Deadband, the LPP calls each DR and starts a timer for each DR. The timer is the value entered in the Deadband Time Delay for DRs. If the timer expires and the LPP pressure (Avg. Low Press Value) is still out of the Setpoint Deadband, the LPP calls each DR again. If the LPP is within the Setpoint Deadband, the timer process is cancelled.

When using telephone communications, set the Deadband Time Delay for DRs value to $a \times 2$ minutes where *a* is the number of DRs that the LPP is calling. When the LPP communicates with one DR, set the value to 2. For two DRs, set the value to 4, and so on.

Error Time Delay for DRs — The LPP calls the DR at this rate if the LPP has sensed that the DR is in Manual or Inner Loop Control Modes. If the DR is in Manual Mode, Inner Loop Mode, or the PID is disabled (Off Mode), the LPP communicates with the DR after the Error Time Delay for DRs has passed to check to see if the DR is in Outer Loop or Adaptive Mode. **The Error Time Delay for DRs should always be less than the Check-in Time for DRs.**

If the DR is against either the Inner Loop Setpoint limit or the Control Output limit, the LPP will not call the DR if the LPP would send a command that would force the DR beyond the limits. The LPP calls the DR if the command will take the DR back into valid limits and away from the other limits. If the LPP detects the DR is against the limits, the LPP still calls at the Error Time Delay for DRs rate to keep up-to-date with events occurring at the DR. The default value is 60 minutes.

Low Battery Voltage Limit — The lowest voltage that the battery can fall before generating a low battery alarm to the DR. Even if alarms are not enabled, a low battery condition is communicated to the DRs. The DR shifts from Adaptive or Outer Loop Mode to Inner Loop control Mode. The default value is 11 volts.

Outlet Press Point Fail Low Limit — The lowest pressure that the Low Press Value can reach before generating an alarm to the DR. Set this value to just below the EU that corresponds to the lowest valid pressure of the pressure transmitter. Even if alarms are not enabled, a bad pressure condition is communicated to the DRs. The DR shifts from Adaptive or Outer Loop Mode to Inner Loop control Mode. The default value is 0.

Outlet Press Point Fail High Limit — The highest pressure that the Low Press Value can reach before generating an alarm to the DR. Set this value to just above the highest pressure of the pressure transmitter. Even if alarms are not enabled, a bad pressure condition is communicated to the DRs. The DR shifts from Adaptive or Outer Loop Mode to Inner Loop control Mode. The default value is 100.

Active Alarms — This field indicates any alarms that are active for this point. LPP alarms are not saved to the Alarm Log unless the actual I/O point type has Alarming Enabled. Alarms include:

- **None** – No Active Alarms.
- **Low Battery** – Low battery alarm.
- **Pressure Point Fail** – Pressure transmitter point failure.

After configuring a LPP and pressing (F8)Save, use “Write to Internal Config Memory” in the GridBoss Flags display. This saves the configuration to programmable ROM in case you must perform a Cold Start. Refer to Section 9.

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SECTION 4 — THE I/O MENU

4.1 SCOPE

This section describes how to configure a GridBoss for reading inputs and supplying outputs. In general, the input and output configurations described in this section should be completed before the application's functionality (such as a PID point or an FST) is configured.

The I/O menu is accessed by selecting the I/O option in the GRIDLINK menu bar. This option provides access to configurable I/O parameters within the GridBoss. Input and output parameters are configured by points using options in the I/O menu. Each input and output has a unique Point Number to identify the input or output. Each I/O point must be individually configured. When configuring similar point types, use the (F4)Copy and (F5)Paste options to speed configuration.

This section contains the following information:

Information	Section	Page Number
AI – Analog Input Configuration	4.2	4-2
AI Alarms	4.2.1	4-4
AI Advanced Features	4.2.2	4-6
AI Calibration	4.2.3	4-7
AO – Analog Output	4.3	4-11
AO Advanced Features	4.3.1	4-13
DI – Discrete Input Configuration	4.4	4-15
DI Alarms	4.4.1	4-17
DI Advanced Features	4.4.2	4-18
DO – Discrete Output Configuration	4.5	4-20
TDO Parameters	4.5.1	4-23
DO Advanced Features	4.5.2	4-24
PI – Pulse Input Configuration	4.6	4-25
Pulse Input Alarms	4.6.1	4-28
PI Advanced Features	4.6.2	4-30

The I/O menu allows you to go directly to the I/O point you want to configure. Point types not available for the GridBoss do not display. Use the (F2)Next and (F3)Prev keys to display various points.

4.2 AI – ANALOG INPUT CONFIGURATION

Select I/O from the menu bar and then choose AI. Analog inputs are analog signals generated by measurement devices such as pressure and temperature transmitters, including RTD probes. Refer to Figure 4-1.

An Analog Input (AI) may be used to communicate the position of the Kixcel to the DR Controller.

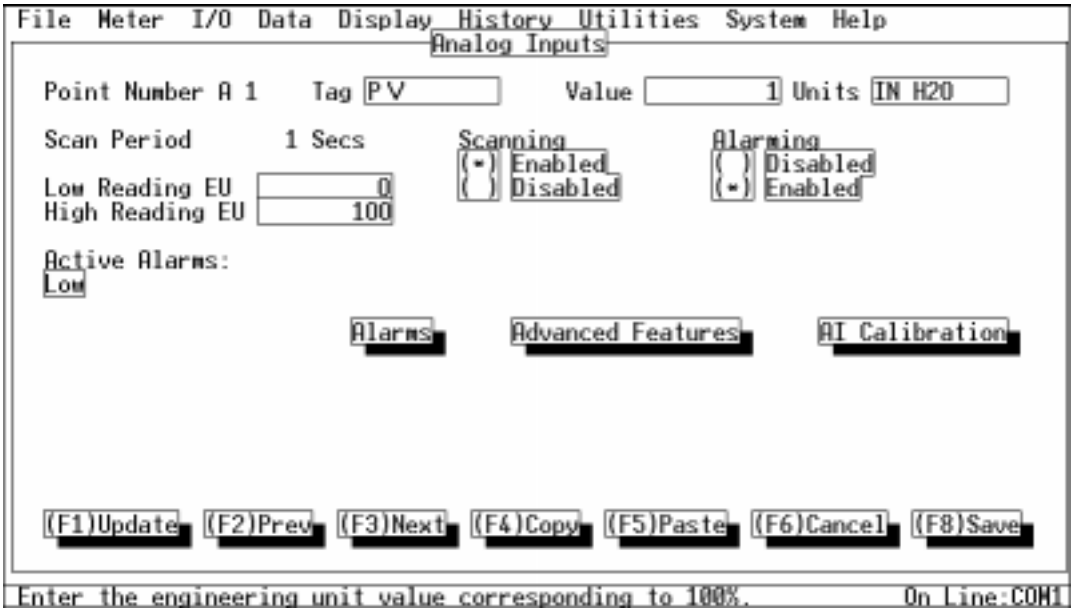

Figure 4-1. Analog Inputs

The **F4(Copy)** and **(F5)Paste** can be used to save configuration time by allowing you to copy data from one configuration screen to another of the same type.

Point Number — The Point Number indicates the location of the point (such as rack and module number) in the GridBoss. The Point Number is automatically assigned by the GridBoss and cannot be edited. Each analog input has a unique Point Number to identify the input. Each AI point must be individually configured. Refer to Section 4.7, Input and Output Point Numbers, on page 4-32.

If there is more than one point available in the GridBoss, you can "page" to the other points by using **F2(Prev)** and **F3(Next)**.

For a District Regulator Controller, the analog input points include:

- A1 – DR inlet pressure
- A2 – DR outlet pressure
- A3 – RTD temperature (main board input)
- E1 – Battery voltage (diagnostic)
- E2 – Charge in (diagnostic)
- B2, B3, and B4 – Analog Inputs from the I/O card

For a Low Pressure Point Controller, the analog input points include:

- A2 – LPP input line pressure
- E1 – Battery voltage (diagnostic)
- E2 – Charge in (diagnostic)
- B2, B3, and B4 – Analog Inputs from the optional I/O card

Tag — Enter up to 10 characters to identify the point being defined in this screen. Any alphanumeric characters, including spaces, may be used.

Value — The value in engineering units of the last analog input scan. In Manual Mode (Scanning Disabled), a value can be entered to override the input. The default value is 13.5.

Units — A 10-character name for the engineering units assigned to the analog input. For example, PSIG, inches, or volts.

Scan Period — The amount of time between updates of the Filter value. Refer to AI Advanced Features on page 4-6. The default value is 1 second. All Analog Inputs are updated based on their individual Scan Periods.

Low Reading EU — The engineering unit corresponding to zero percent input. For example, if a temperature transmitter is connected to the analog input with a range of -40 degrees F to 160 degrees F, the Low Reading EU would be set to -40.

High Reading EU — The engineering units corresponding to 100 percent input. For example, if a temperature transmitter is connected to the analog input with a range of -40 degrees F to 160 degrees F, the High Reading EU would be set to 160.

Scanning — The Scanning options let you enable or disable scanning for this point. For the input to process the field input, it must be Enabled. While Scanning is Enabled, the Value parameter indicates the current input reading. When Scanning is Disabled, it effectively places the input into Manual Mode. An alarm is generated when Scanning is Disabled.

Alarming — You can either enable or disable limit Alarming for this point. If you enable Alarming, the limit alarms (four levels, Rate, and Deadband) are configured and displayed in the Alarms dialog box, which is obtained by using the **Alarms** pushbutton. Alarms are also logged to the Alarm Log. To optimize processor time, alarms should be Enabled only when necessary. If you disable Alarming, no limit alarms generate for this point, regardless of the Alarm configuration.

Active Alarms — This field indicates any alarms that are active for this point. When Alarming is Enabled, the limit alarms (such as Low Alarm and Rate Alarm) that are active appear. Even if Alarming is Disabled, the Point Fail alarm and Manual (Scanning Disabled) indicators can still appear. If Alarming is Enabled, an alarm is generated when Scanning is Disabled.

AI Alarms — Refer to page 4-4.

Advanced Features — Refer to page 4-6.

AI Calibration — Refer to page 4-7.

After configuring a point and pressing (F8)Save, use "Write to Internal Config Memory" in the GridBoss Flags display to save I/O configuration to programmable ROM in case you must perform a Cold Start. Refer to Section 9.

4.2.1 AI Alarms

When you use the **Alarms** pushbutton in the Analog Inputs screen shown in Figure 4-1, a dialog box appears that lets you configure the alarms for this analog input. Refer to Figure 4-2.

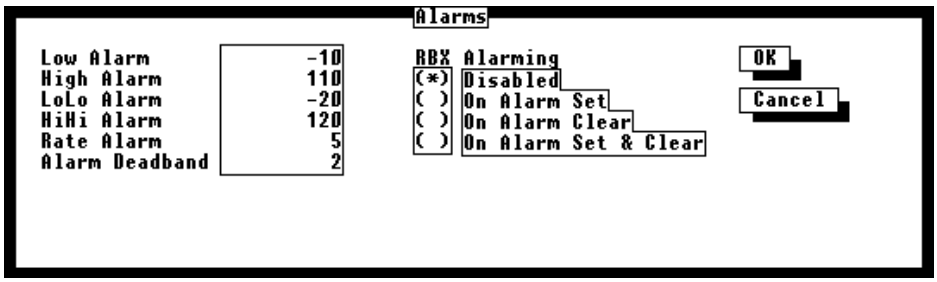

Figure 4-2. Analog Input Alarms

Even if you do not plan to use all the alarms, check and adjust the value of each one so no false alarms generate.

NOTE

The Low Battery Voltage Limit (AI point number E1) and the Outlet Press Point Fail Low and High Limits (AI point number A2) can be set to send RBX alarms using the AI point Alarming options. The alarms should be set slightly beyond the range of the transducers. If a pressure transducer electrically shorts or opens, the signal goes beyond the 4 to 20mA range and triggers the RBX alarms.

Low Alarm — The limit value, in engineering units, to which the input must fall to generate a Low Alarm. The default value is -10.

High Alarm — The limit value, in engineering units, to which the input must rise to generate a High Alarm. The default value is 110.

LoLo Alarm — The limit value, in engineering units, to which the input must fall to generate a Low-Low Alarm. The value is set lower than the Low Alarm. The default value is -20.

HiHi Alarm — The limit value, in engineering units, to which the input must rise to generate a High-High Alarm. The value is set higher than the High Alarm. The default value is 120.

Rate Alarm — The value, in engineering units, that represents the maximum amount of change allowed between updates. Refer to AI Scanning. If the change is equal to, or greater than this value, an alarm is generated. To disable this Rate Alarm without disabling the other alarms, the Rate Alarm value must be set greater than the Span of the analog input. The default value is 5.

Alarm Deadband — The value, in engineering units, that is an inactive zone above the Low Alarm limits and below the High Alarm limits. The purpose of the Alarm Deadband is to prevent the alarm from being set and cleared continuously when the input value is oscillating around the alarm limit. This also prevents the Alarm Log from being over-filled with data. The default value is 2.

RBX Alarming — RBX Alarming allows you to send a Report-by-Exception alarm to the Host when the point alarm condition is met. Refer to Section 9, Configuring RBX Alarming.

Disabled – Select Disabled under RBX Alarming to turn this option OFF.

On Alarm Set – When the point enters an alarm condition, the GridBoss generates a Report-by-Exception message to the Host.

On Alarm Clear – When the point leaves an alarm condition, the GridBoss generates a Report-by-Exception message to the Host.

On Alarm Set & Clear – In either condition, a Report-by-Exception message generates. Note that RBX Alarming also requires the communications port to be properly configured. Select Disabled if you do not want RBX Alarming to be active for this point.

After configuring a point and pressing (F8)Save, use “Write to Internal Config Memory” in the GridBoss Flags display. This will save I/O configuration to programmable ROM in case you must perform a Cold Start. Refer to Section 9.

4.2.2 AI Advanced Features

When you press the Advanced Features pushbutton in the Analog Inputs screen shown in Figure 4-1, a dialog box appears that lets you configure features such as filtering, A/D conversions, and clipping for the selected analog input. Refer to Figure 4-3.

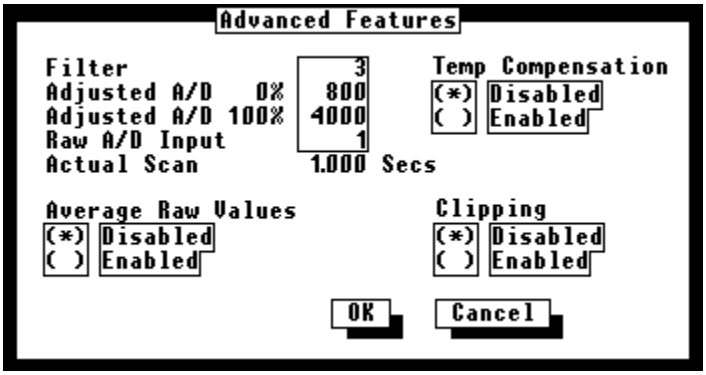

Figure 4-3. Analog Inputs Advanced Features

Filter — A weighted sample using a percentage of the last value plus a percentage of the new value. The entered data is the percentage of the last value used. The default value is 3. The filter is calculated every Scan Period by the formula:

(Last Value × Entered %) + (New Value × (100 - Entered %)) = Filtered Value

Adjusted A/D 0% — The calibrated analog-to-digital (A/D) reading corresponding to zero percent input. This value is used to convert the input to engineering units. In the Calibrate function, this value is altered to set the zero percent input exactly at the Low Reading EU value to eliminate transmitter and system errors. The default value is 800.

Adjusted A/D 100% — The calibrated A/D reading corresponding to 100 percent input. This value is used to convert the input to engineering units. In the Calibrate function, this value is altered to set the 100 percent input exactly at the High Reading EU value to eliminate transmitter and system errors. The default value is 4000.

Raw A/D Input — The current reading directly from the analog-to-digital converter. The default value is 0.

Actual Scan — This is the actual amount of time in seconds that passes between scans. This number should be the same as shown for the Scan Period parameter if the system is not overloaded. The default value is 0.

Average Raw Values — When Enabled, the average of the raw readings during the Scan Period is calculated and used as the Raw A/D Input during EU calculations. For example: An analog input point configured with a Scan Period of 1 second and Average Raw Values is Enabled obtains a new value from the A/D every 200 milliseconds. During the Scan Period, 5 values are obtained from the A/D and summed together. At EU calculation, the values summed are divided by the Actual Scan Period display and are used as the Raw A/D Input.

You may desire to disable this function to acquire instantaneous values.

Temp Compensation — When Enabled, a temperature compensation curve is applied to the analog input using the board temperature of the GridBoss as a reference. Use this feature to improve the A/D conversion accuracy at temperature extremes for modular analog inputs only; built-in analog inputs already have temperature compensation. If you use this feature, be sure to perform a calibration after it is Enabled.

Clipping — When Enabled, the software forces the Filtered EUs to stay within the range defined by the cutoff limits. Set the cutoff limits by using the LoLo Alarm and HiHi Alarm parameters.

4.2.3 AI Calibration

The AI Calibration pushbutton allows you to calibrate the Analog Input displayed in this screen. Perform the following steps to calibrate an analog input:

CAUTION

During calibration, the GridBoss will time-out and disconnect if it is left idle for extended amounts of time. Your calibration values will be lost and you must reconnect and to begin calibration from the beginning.

1. Press the **AI Calibration** pushbutton. A dialog box displays as shown in Figure 4-4, and the analog input is automatically “frozen” at the value displayed in the dialog box.

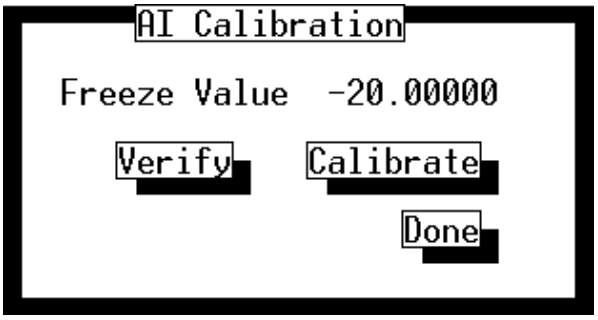

Figure 4-4. AI Calibration

2. If the input has been calibrated before, you can verify the calibration (this can also be done immediately after performing calibration). Press the **Verify** pushbutton to proceed with verification of an input's calibration. Refer to Figure 4-5 and to Section 3.3.3 for details. Otherwise, skip to Step 6 to begin calibration.

Figure 4-5. Verify AI Calibration

3. Enter the **Dead Weight/Tester Value**. This is the input desired for the test value and is the actual value expected by the test equipment being calibrated against. For example, when calibrating temperature for an RTD input, enter the degrees value associated with the resistance set up in the decade box.
4. Press the **Log Verify** pushbutton. Repeat Steps 3 and 4 for each value to be verified.
5. Press the **Cancel** pushbutton. If calibration is needed, proceed to Step 6; otherwise, press the Done pushbutton.
6. Press the **Calibrate** pushbutton. Refer to Figure 4-4 and to Section 3.3.4 for details.
7. Calibrate the zero value (0% of range) for the Analog Input. Enter the **Dead Weight/Tester Value** (in engineering units) and press the **Set Zero** pushbutton. Refer to Figure 4-6.

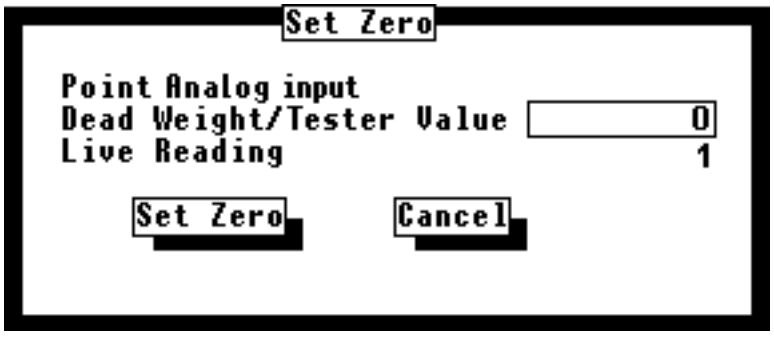

Figure 4-6. AI Set Zero

8. Calibrate the span value (100% of range) for the Analog Input. Enter the **Dead Weight/Tester Value** (in engineering units) and press the **Set Span** pushbutton. Refer to Figure 4-7.

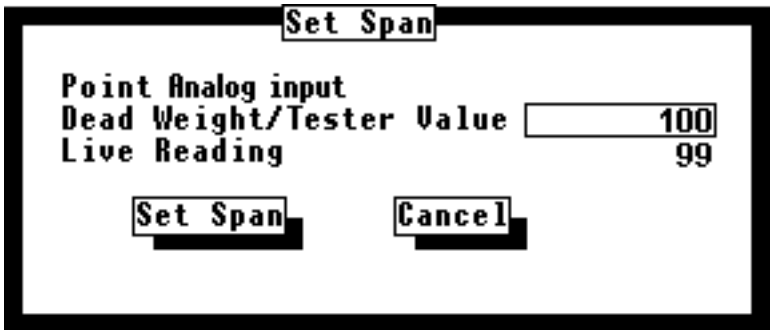

Figure 4-7. AI Set Span

9. If desired, calibrate Midpoint 1 (such as 25% of range) for the Analog Input. Enter the **Dead Weight/Tester Value** (in engineering units) and press the **Set Mid 1** pushbutton. Refer to Figure 4-8. Otherwise, use the **Done** pushbutton and proceed to Step 12.

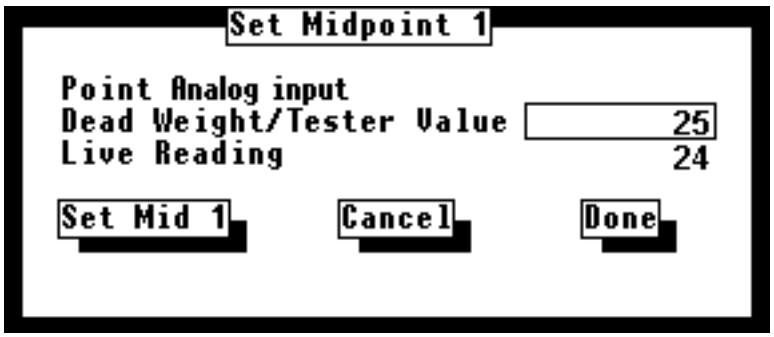

Figure 4-8. AI Set Midpoint 1

10. If desired, calibrate Midpoint 2 (such as 50% of range) for the Analog Input. Enter the **Dead Weight/Tester Value** (in engineering units) and press the **Set Mid 2** pushbutton. Refer to Figure 4-9. Otherwise, use the **Done** pushbutton and proceed to Step 12.

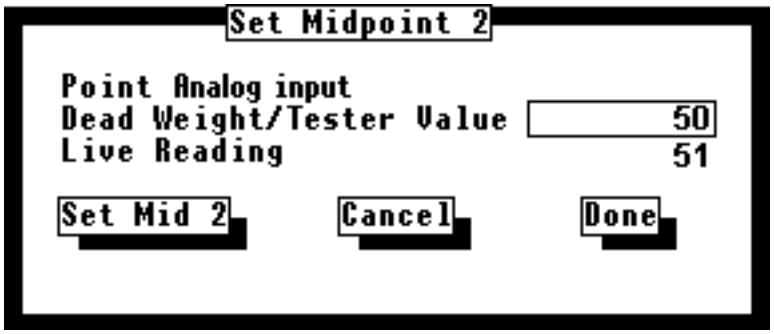

Figure 4-9. AI Set Midpoint 2

11. If desired, calibrate Midpoint 3 (such as 75% of range) for the Analog Input. Enter the **Dead Weight/Tester Value** (in engineering units) and press the **Set Mid 3** pushbutton. Refer to Figure 4-10. Otherwise, use the **Done** pushbutton and proceed to Step 12.

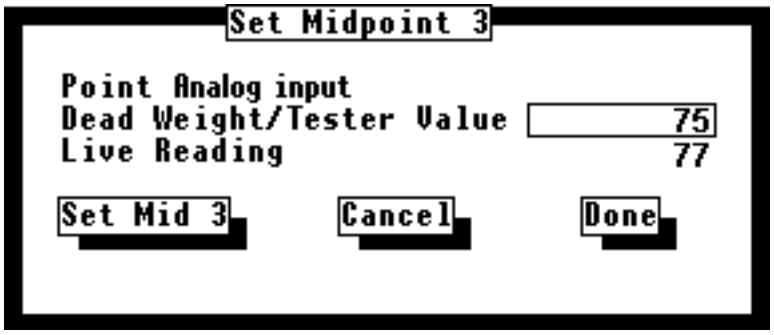

Figure 4-10. AI Set Midpoint 3

12. Press the **Done** pushbutton to close the main calibration window (Figure 4-4) and unfreeze the associated input.

4.3 AO – ANALOG OUTPUT

Select I/O from the menu bar and then choose AO. Analog outputs are analog signals generated by the GridBoss to regulate equipment such as control valves or any device requiring proportional control. Refer to Figure 4-11.

An Analog Output can be used to adjust the Setpoint at the Kixcel. When an Analog Output (AO) is used to send the Setpoint to the Kixcel, an Analog Input (AI) may be used to communicate the position of the Kixcel to the DR Controller.

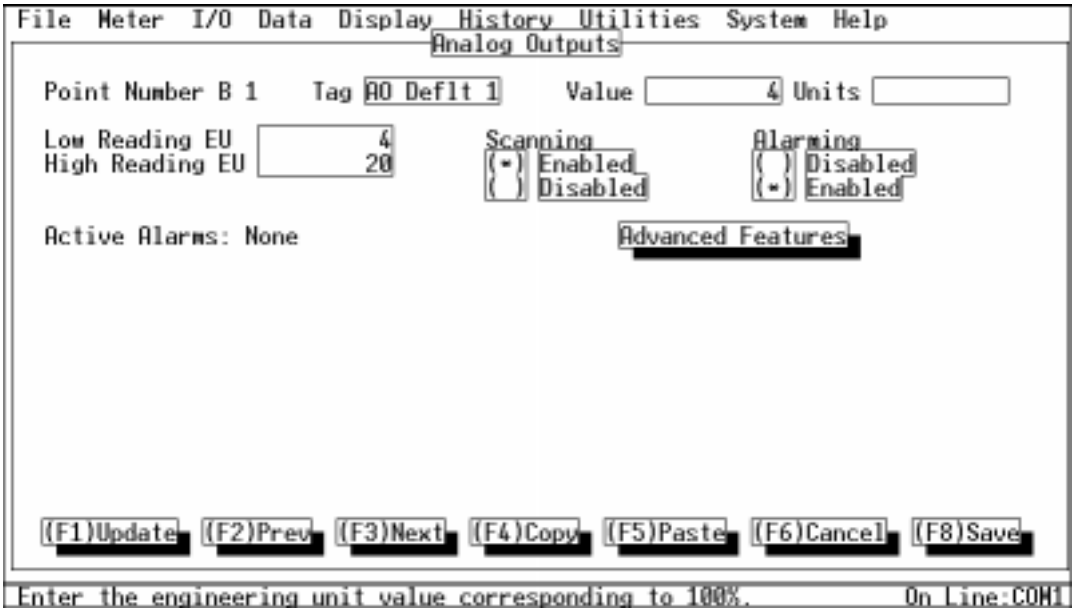

Figure 4-11. Analog Outputs

The **F4(Copy)** and **(F5)Paste** can be used to save configuration time by allowing you to copy data from one configuration screen to another of the same type.

NOTE

If you make changes in the display and then try to quit without saving the changes, a message box pops up. You can either press Enter to return to the display, or press ESC to discard the changes and exit the display. Save changes by using the (F8)Save.

Point Number — The Point Number indicates the location of the point such as rack and module number in the GridBoss. The Point Number is automatically assigned by the GridBoss and cannot be edited. Each analog output has a unique Point Number to identify the output. Each AO point must be individually configured. Refer to Section 4.7, Input and Output Point Numbers, on page 4-32.

If there is more than one point of this type available in the GridBoss, you can "page" to the other points by using **F2(Prev)** and **F3(Next)**.

One Analog Output is available at Point Number B1 and is physically located on the I/O card.

Tag — Enter up to 10 characters to identify the point being defined in this screen. Any alphanumeric characters, including spaces, may be used.

Value — The Value in engineering units of the last analog output scan. In Manual Mode, a Value can be entered to override the output. The default value is 4.

Units — A 10-character name for the engineering units (EU) assigned to the analog output. For example: PSIG, degrees F, or volts.

Low Reading EU — The engineering units corresponding to zero percent output. The Analog Output takes the EU Value, converts it to a digital-to-analog (D/A) value, and transmits the value to the AO. If the EU Value is less than the Low Reading EU, the engineering unit is set equal to the Low Reading EU before converting it to a D/A value. The D/A value sent is the Raw D/A Output. The D/A value is scaled using the Adjusted D/A 0% and the Adjusted D/A 100% values set in the AO Advanced Features dialog. The default value is 4.

High Reading EU — The engineering units corresponding to 100 percent output. The Analog Output takes the EU Value and converts it to a D/A value and transmits the value to the AO. If the EU Value is greater than the High Reading EU, the EU Value is set equal to the High Reading EU before converting it to a D/A value. The D/A value sent is the Raw D/A Output. The D/A value is scaled using the Adjusted D/A 0% and the Adjusted D/A 100% values set in the AO Advanced Features dialog. The default value is 20.

Scanning — These options let you enable or disable scanning for this point. For the output to receive and process the field output, it must be Enabled. While Scanning is Enabled, the Status indicates the output state. When Scanning is Disabled (Manual Mode), the analog output is placed into Manual Mode. If Alarming is Enabled, an alarm is generated when Scanning is Disabled.

Alarming — These options let you enable or disable Alarming for this point. If the AO has Alarming Enabled, the AO can generate two types of alarms: Manual Mode or Point Fail. The **Manual Mode** alarm is generated if the AO is placed into Manual Mode, and the **Point Fail** alarm occurs if the AO hardware reports a malfunction. If these alarms occur, an alarm event is written to the Alarm Log. These alarms can also be set up to generate a spontaneous Report-by-Exception (RBX) message on either a Set or a Clear.

To optimize processor time, alarms should be enabled only when necessary. If you disable alarms, no alarm will be logged for this point.

Active Alarms — This field indicates any alarms that are active for this point. When Alarming is Enabled, the limit alarms (such as Low Alarm and Rate Alarm) that are active appear. Even if Alarming is disabled, the Point Fail alarm and Manual (Scanning Disabled) indicators can still appear. If Alarming is Enabled, an alarm is generated when Scanning is Disabled.

Advanced Features — Refer to page 4-13.

After configuring a point and pressing (F8)Save, use "Write to Internal Config Memory" in the GridBoss Flags display to save I/O configuration to programmable ROM in case you must perform a Cold Start. Refer to Section 9.

4.3.1 AO Advanced Features

When you use the **Advanced Features** pushbutton in the Analog Outputs screen shown in Figure 4-11, a dialog box appears that lets you configure features such as resetting and RBX Alarming for the analog output. Refer to Figure 4-12.

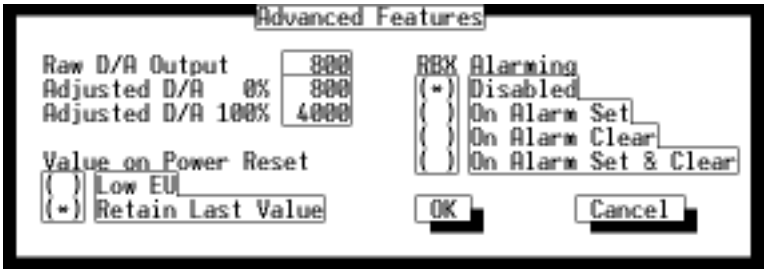

Figure 4-12. Analog Outputs Advanced Features

Raw D/A Output — The current reading directly from the digital-to-analog converter. The D/A value sent to the AO is the Raw D/A Output. The default value is 800.

Adjusted D/A 0% — The value decoded by the digital-to-analog converter for zero percent output. This value is also used to convert the output to engineering units. The default value is 800.

Adjusted D/A 100% — The value decoded by the digital-to-analog converter for 100 percent output. This value is also used to convert the output to engineering units. The default value is 4000.

Value on Power Reset — When **Low EU** is selected, the Value parameter is cleared upon a reset of the GridBoss, such as a power restart or a Warm Start and the Low Reading EU is used as the new Value. If **Retain Last Value** is selected, the last output value is used after a reset. If the AO is set to Manual Mode (Scanning Disabled), no changes occur unless manually entered.

RBX Alarming — RBX Alarming allows you to send a Report-by-Exception alarm to the Host when the point alarm condition is met.

Disabled — Select Disabled under RBX Alarming to turn this option OFF.

On Alarm Set — When the point enters an alarm condition, the GridBoss generates a Report-by-Exception message to the Host.

On Alarm Clear — When the point leaves an alarm condition, the GridBoss generates a Report-by-Exception message to the Host.

On Alarm Set & Clear — In either condition, an RBX message generates to the Host. Note that RBX Alarming also requires the communications port to be properly configured.

4.4 DI – DISCRETE INPUT CONFIGURATION

Select I/O from the menu bar and then choose DI. Discrete inputs come from relays, switches, and other devices, which generate an on/off, open/close, or high/low signal. Refer to Figure 4-13.

The DI can be used with the optional intrusion switch to detect tampering with the GridBoss.

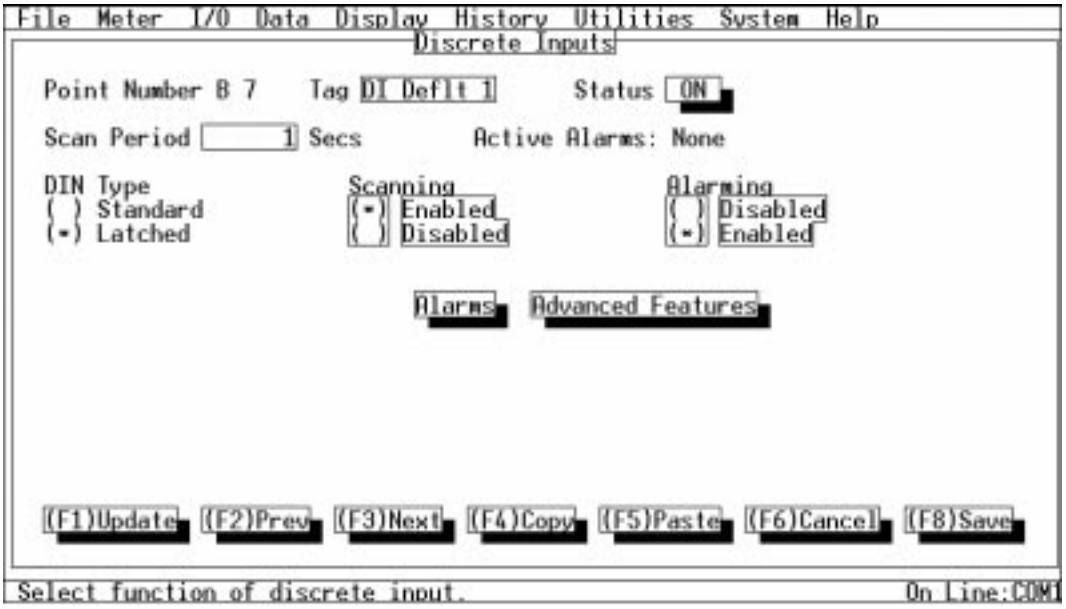

Figure 4-13. Discrete Inputs

When using a LPP Controller, an optional I/O card must be installed to use Discrete Inputs.

The **(F4)Copy** and **(F5)Paste** can be used to save configuration time by allowing you to copy data from one configuration screen to another of the same type.

NOTE

If you make changes in the display and then try to quit without saving the changes, a message box pops up. You can either press Enter to return to the display, or press ESC to discard the changes and exit the display. Save changes by using the (F8)Save.

The configuration of all I/O points is saved to programmable ROM when “Write to Internal Config Memory” is activated from the GridBoss Flags display.

Point Number — The Point Number indicates the location of the point such as rack and module number in the GridBoss. The Point Number is automatically assigned by the GridBoss and cannot be edited. Each discrete input has a unique Point Number to identify the input. Each DI point must be individually configured. Refer to Section 4.7, Input and Output Point Numbers, on page 4-32.

If there is more than one point of this type available in the GridBoss, you can "page" to the other points by using **F2(Prev)** and **F3(Next)**.

Discrete Inputs are associated with Point Numbers B7 through B10 and are physically located on the I/O card.

Tag — Enter up to 10 characters to identify the point being defined in this screen. Any alphanumeric characters, including spaces, may be used.

Status — The Status field is both an indicator and a control. As an indicator, it shows the state of the discrete input: OFF normally indicates that the input is OFF or that a switch is open; ON normally indicates that the input is ON or that a switch is closed.

When Scanning is Disabled (Manual Mode), the Status can be changed by pressing the Status ON/OFF pushbutton or by pressing the Enter key when the Status field is active, and then performing a Save. Note that the state of the input is reversed by selecting Inverted in Advanced Features.

Scan Period — The calculation period, namely the amount of time between updates as specified in seconds for the Scan Period. The default value is 1 second.

Active Alarms — This field indicates any alarms that are active for this point. When Alarming is Enabled, the limit alarms (such as Low Alarm and Rate Alarm) that are active appear. Even if Alarming is Disabled, the Point Fail alarm and Manual (Scanning Disabled) indicators can still appear. If Alarming is Enabled, an alarm is generated when Scanning is Disabled.

DIN Type — The options listed let you select how you want this discrete input to function.

Standard — Select Standard if you want the Discrete Input status to follow the actual field input.

Latched — Select Latched if you want the Discrete Input status, on an active transition of the input (from OFF to ON), to change to ON and remain in that state until it is cleared. To be cleared, the Status parameter must be changed to the OFF state, either by software or by you. If the DI has the Input Inverted field set, the field input is inverted in the Status field (ON becomes OFF and vice-versa).

Scanning — These options let you enable or disable scanning for this point. For the input to receive and process the field input, it must be Enabled. While Scanning is Enabled, the Status field indicates the input state, ON or OFF. When Scanning is Disabled (Manual Mode), the Status becomes a control for determining the state of the input to the GridBoss, overriding the field input and effectively placing the input into Manual Mode. If Alarming is Enabled, an alarm is generated when Scanning is Disabled.

Alarming — These options let you enable or disable Alarming for this point. If you enable alarms, the alarms are configured and display in the Alarms dialog box. Alarms are also logged to the Alarm Log. To optimize processor time, alarms should be Enabled only when necessary. If you disable alarms, no alarm generates for this point, regardless of the Alarm configuration. Two types of alarms are possible. The **Manual Mode** alarm is generated if the DI is placed into Manual Mode (Scanning Disabled). The **Status Change** alarm occurs if the DI changes from OFF to ON in the Status.

Alarms — Refer to page 4-17.

Advanced Features — Refer to page 4-18.

After configuring a point, press (F8)Save and use “Write to Internal Config Memory” in the GridBoss Flags display to save I/O configuration to programmable ROM in case you must perform a Cold Start. Refer to Section 9.

4.4.1 DI Alarms

When you use the **Alarms** pushbutton in the Discrete Inputs screen shown in Figure 4-13, a dialog box appears that lets you configure the alarms for this Discrete Input. If alarms occur, an alarm event is written to the Alarm Log. For all discrete inputs, you can configure RBX Alarming and view Active Alarms.

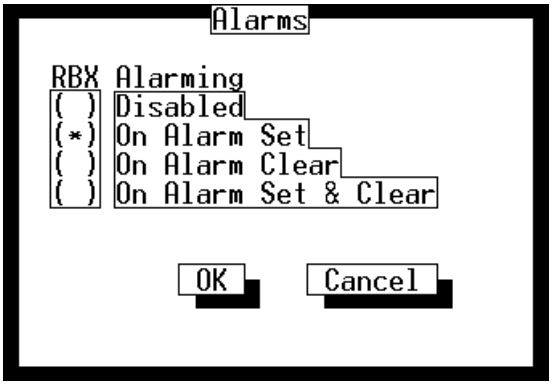

Figure 4-14. Discrete Input Alarms

RBX Alarming — RBX Alarming allows you to send a Report-by-Exception alarm to the Host when the point alarm condition is met. Refer to Section 9, Configuring Report-by-Exception.

Disabled — Select Disabled to turn RBX Alarming OFF.

On Alarm Set — When the point enters an alarm condition, the GridBoss generates a Report-by-Exception message to the Host.

On Alarm Clear — When the point leaves an alarm condition, the GridBoss generates a Report-by-Exception message to the Host.

On Alarm Set & Clear — In either condition, an RBX message generates. Note that RBX Alarming also requires the communications port to be properly configured.

4.4.2 DI Advanced Features

When you use the **Advanced Features** pushbutton in the Discrete Inputs screen shown in Figure 4-13, a dialog box appears that lets you configure features such as filtering, input inversion, and counter values for the discrete input. Refer to Figure 4-15.

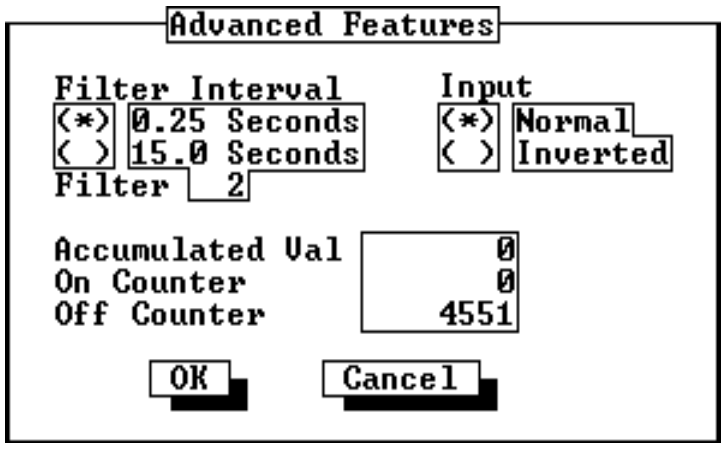

Figure 4-15. Discrete Inputs Advanced Features

Filter Interval and Filter — These two parameters are used together to determine the amount of time that the discrete input must remain in the ON (high) state before it is recognized as such. The **Filter** time is entered as a number from 0 to 255, and the **Filter Interval** selection determines the time basis. The discrete input returns to the OFF state immediately upon detection of the ON to OFF transition; there is no filtering for this transition.

When Filter Interval is 0.25 Seconds, the Filter is defined as the number of 250-millisecond intervals before the input is recognized.

When Filter Interval is 15.0 Seconds, the Filter is defined as the number of 15-second intervals before the input is recognized.

The default value for Filter Interval is 0.25 and the default value for Filter is 2.

Input — Select **Normal** for the input going high (contact closure) to produce an ON Status. Select **Inverted** to cause the field input to be inverted in the Status parameter field. If the DI has the Input Inverted field set, the field input is inverted in the Status field (ON becomes OFF and vice-versa). An open circuit in the field would then be indicated as ON in the Status parameter, and closed contacts would be indicated as OFF in the Status.

Accumulated Val — Accumulated value is the number of times the discrete input goes from OFF to ON. The accumulator is a 32-bit number with a maximum count of 4,294,967,295. The accumulator can be preset by entering the desired value or can be cleared by entering "0." The default value is 0.

On Counter — Counts the number of scan periods when the Status parameter is in the ON state. The On Counter, which does not operate in Manual Mode (Scanning Disabled), is a 32-bit number that automatically "rolls over" when it reaches its maximum value. The On Counter can be preset by entering the desired value or cleared by setting the Status parameter to OFF. The default value is 0.

Off Counter — Counts the number of scan periods when the Status parameter is in the OFF state. The counter, which does not operate in Manual Mode (Scanning Disabled), is a 32-bit number that automatically "rolls over" when it reaches its maximum value. The Off Counter can be preset by entering the desired value or can be cleared by setting the Status parameter to ON. The default value is 0.

4.5 DO – DISCRETE OUTPUT CONFIGURATION

Select I/O from the menu bar and then choose DO. Discrete Outputs are high/low outputs used to turn equipment ON and OFF. A Discrete Output can be configured in one of several different modes: Latched, Momentary, Toggle, TDO (Timed Duration Output), and TDO Toggle. Refer to Figure 4-16.

A pair of Discrete Outputs (Timed Duration Output) can be used to open and close the Kixcel.

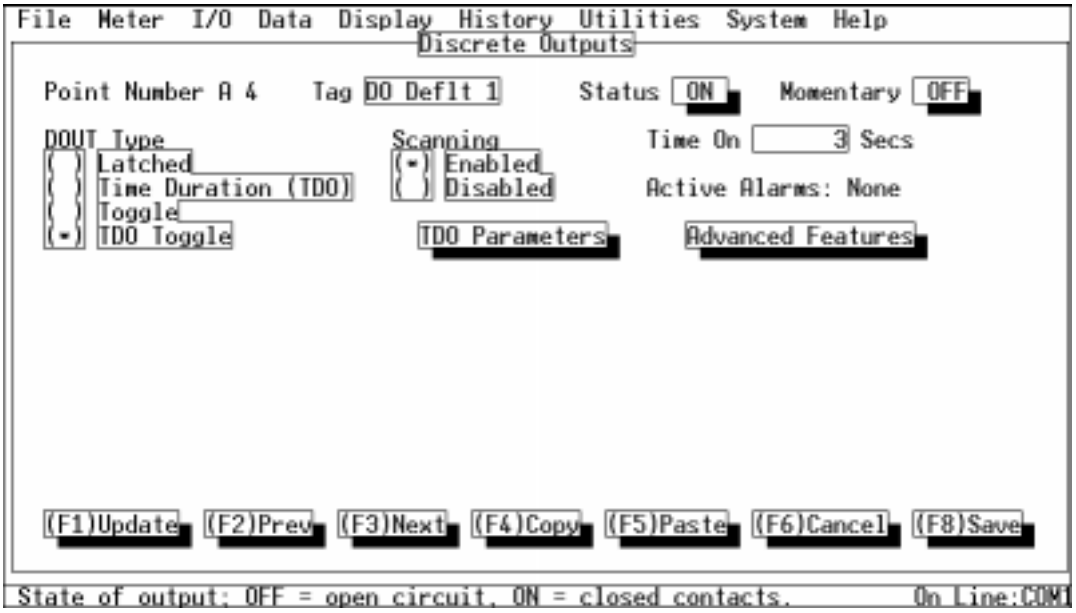

Figure 4-16. Discrete Outputs

In other installations, a Discrete Output may be set to send a pulse to a specified device. For a GridBoss installation, the built-in DO pulse is not used.

Point Number — The Point Number indicates the location of the point (such as rack and module number) in the GridBoss. The Point Number is automatically assigned by the GridBoss and cannot be edited. The Point Number is automatically assigned by the GridBoss and cannot be edited. Each discrete output has a unique Point Number to identify the input. Each DO point must be individually configured. The **(F4)Copy** and **(F5)Paste** can be used to save configuration time by allowing you to copy data from one configuration screen to another of the same type. Refer to Section 4.7, Input and Output Point Numbers, on page 4-32.

If there is more than one point of this type available in the GridBoss, you can “page” to the other points by using the **(F2)Prev** and **(F3)Next**.

Discrete Outputs are located at the following Point Numbers and their locations are:

- Point Number A4 – Main card.
- Point Number B5 – I/O card.
- Point Number B6 – I/O card.

Tag — Enter up to 10 characters as the name to identify the point being defined in this screen. Any alphanumeric characters, including spaces, may be used.

Status — The Status field is both an indicator and a control. As an indicator, it shows the state of the discrete output: OFF normally indicates that the output is OFF or that a switch is open; ON normally indicates that the output is ON or that a switch is closed.

When Scanning is Disabled (Manual Mode) and in the OFF state, the Status can be changed by pressing the pushbutton and setting Status to ON.

The default value is OFF.

Momentary — The pushbutton next to the Momentary field is both an indicator and a control. When set to ON, the discrete output (regardless of its configured DO Type) is placed into the Momentary mode. This is sometimes called "one-shot." Immediately after the ON setting is saved using **(F8)Save**, the discrete output is activated for the amount of time defined in the Time On parameter. The Momentary pushbutton automatically resets to OFF.

DOUT Type — The four options let you select how you want this discrete output to function:

Latched — Select Latched if you want the Discrete Output status, on an active transition of the output (from OFF to ON), to change to ON and remain in that state until it is cleared. To be cleared, the Status parameter must be changed to the OFF state, either by the software or by you.

Time Duration (TDO) — When the TDO (Timed Duration Output) mode is enabled, the TDO Parameters pushbutton becomes available. The TDO Parameters pushbutton provides a dialog box of additional parameters to specify scaling and engineering unit conversion. For Timed Duration Output, the quantitative value calculated by the PID loop is converted into a time that the discrete output is active versus the time it is inactive, similar to an analog output. Refer also to Appendix A.

Toggle — Select Toggle if you want the Discrete Output to enter the Toggle mode. Toggle mode enables a square wave output for which:

- Both the Time On and Time Off are defined by the Time On parameter.
- Time On and Time Off are equal.

TDO Toggle — Select TDO Toggle if you want the Discrete Output to enter the TDO Toggle mode. In the TDO (Timed Duration Output) Toggle mode, the DO continuously repeats in a cycle defined by the Cycle Time parameter with the on-time duration being controlled by the EU Value parameter. Select TDO Parameters pushbutton to set the Cycle Time and EU Value parameters. Refer to Appendix A.

Scanning — These options let you enable or disable Scanning for this point. For the output to process the field output, it must be Enabled. While Scanning is Enabled, the Status field indicates the output state. When Scanning is Disabled (Manual Mode), the Status field becomes a control for determining the state of the output from the GridBoss, overriding the field output and effectively placing the output into Manual Mode. If Alarming is Enabled, an alarm is generated when Scanning is Disabled.

Time On — In Momentary mode, this is the amount of time (in seconds) that the momentary contact is energized. In the Toggle mode, this value is the time (in seconds) between switching ON or OFF. In the TDO and TDO Toggle modes, this value is just an indicator of the on-time of the output (EU Value) pulse width. In each case, the default value is 1.

Active Alarms — The Active Alarms field indicates any alarms that are active for this point.

TDO Parameters — Refer to page 4-23.

Advanced Features — Refer to page 4-24.

After configuring a point, press (F8)Save and use “Write to Internal Config Memory” in the GridBoss Flags display to save I/O configuration to programmable ROM in case you must perform a Cold Start. Refer to Section 9.

4.5.1 TDO Parameters

The TDO Parameters pushbutton only becomes accessible when one of the DOUT Types other than Latched is selected in the Discrete Outputs screen. This screen is used to establish Timed Duration Output values. Refer to Figure 4-17 and Appendix A.

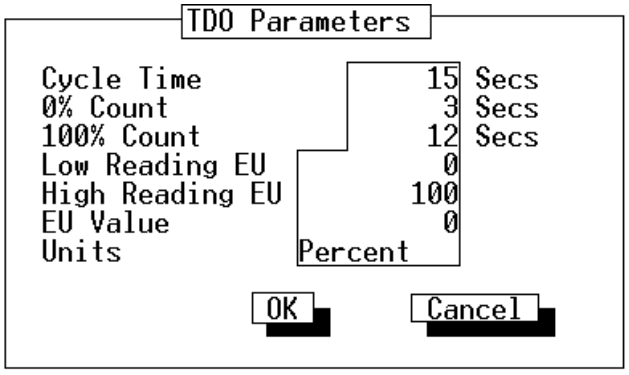

Figure 4-17. Timed Duration Output Parameters

Cycle Time — Applicable only to the TDO Toggle mode of operation. The Cycle Time defines the total time of one cycle (the sum of the ON time and OFF time) in seconds. After a cycle has been completed, a new cycle is initiated. The default is 15 seconds.

0% Count — The count in seconds that represents a zero percent output pulse width. The default is 3 seconds. This is the minimum amount of time that the TDO can be energized to move the motor. Set the 0% Count to a value that allows movement, but also provides good resolution of control.

100% Count — The count in seconds that represents a 100 percent output pulse width The default is 12 seconds. 100% Count is the maximum amount of time that the TDO can be energized to move the motor. Normally, this is the amount of time it takes for the actuator to move the valve from fully open to fully closed.

Low Reading EU — The engineering units value corresponding to the 0% Count. This is the low reading EU. The default value is 0.

High Reading EU — The engineering units value corresponding to the 100% Count. This is the high reading EU. The default value is 100.

EU Value — This parameter applies to a discrete output configured in the TDO or TDO Toggle mode. When a value is saved (written) to this parameter, the discrete output is activated according to the magnitude of the value. The amount of on-time that a given value represents is determined by the scaling from 0% Count, 100% Count, Low Reading EU, and High Reading EU. The default value is 0.

Units — A 10-character name for the engineering units assigned to the TDO output. The default value is Percent.

4.5.2 DO Advanced Features

Use the DO Advanced Features to set a value for the Accumulated Value parameter and establish Clear on Reset response. Refer to Figure 4-18.

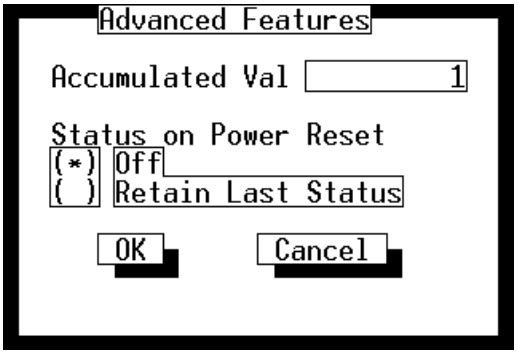

Figure 4-18. Discrete Outputs Advanced Features

Accumulated Val — Accumulated value is the number of ON to OFF transitions of the discrete output. The accumulator is a 32-bit number with a maximum count of 4,294,967,295. The accumulator can be preset by entering the desired value or cleared by entering zero. The default value is 0.

Status on Power Reset — When set to Off, the Status parameter is cleared and set to OFF upon a reset of the GridBoss, such as a power restart or a Warm Start. When set to **Retain Last Status**, the last output value is used after a reset for the Status. The default value is Retain Last Status.

4.6 PI – PULSE INPUT CONFIGURATION

Select I/O from the menu bar and then choose PI. Pulse inputs (PI) are pulse trains (square wave signals) generated by measurement devices such as turbine meters. The Pulse Input accepts digital level ON/OFF signals from an external device and accumulates the changes over a configured period of time. The PI can also determine a rate from the accumulated pulses over a configured period of time. Refer to Figure 4-19.

NOTE

Pulse Inputs are not used in the GridBoss Gas Pressure Control System, but are detailed here in case you desire to use PIs in a different type of application.

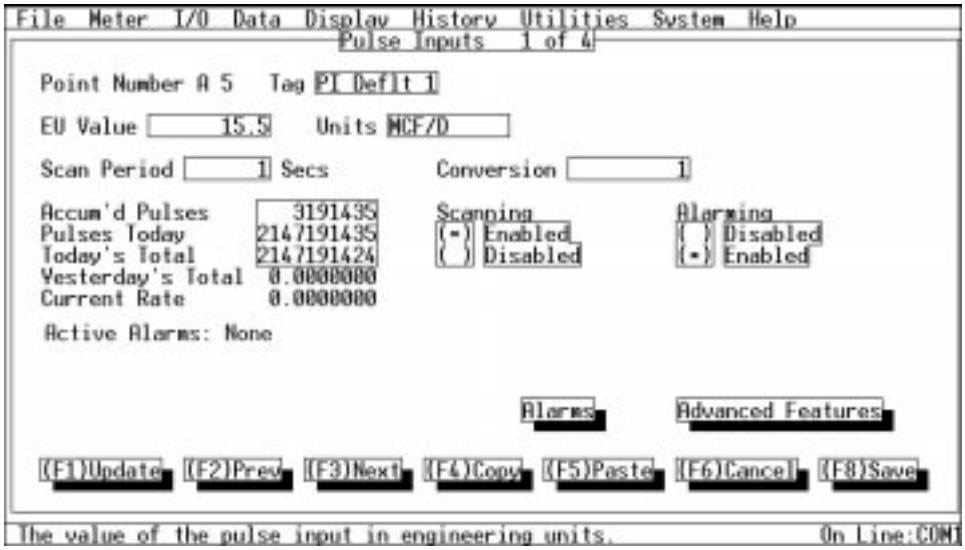

Figure 4-19. Pulse Inputs Screen

Pulse input alarms, when Enabled, only occur when the pulse input is configured for Rate and not for Accumulate. In accumulate, the alarm code only reflects the occurrence of the pulse input configured in Manual Mode.

Point Number — The Point Number indicates the location of the point (such as rack and module number) in the GridBoss. The Point Number is automatically assigned by the GridBoss and cannot be edited. Each pulse input has a unique Point Number to identify the input. Each PI point must be individually configured. The **(F4)Copy** and **(F5)Paste** can be used to save configuration time by allowing you to copy data from one configuration screen to another of the same type. Refer to Section 4.7, Input and Output Point Numbers, on page 4-32.

If there is more than one point of this type available in the GridBoss, you can "page" to the other points by using the **(F2)Prev** and **(F3)Next**.

Pulse Inputs are associated with the following point numbers and physical locations:

- A5 – Sensor Module.
- A6 – Sensor Module.
- B11 – I/O card.
- B12 – I/O card.

Tag — Enter up to 10 characters to identify the point being defined in this screen. Any alphanumeric characters, including spaces, may be used.

EU Value —The EU Value is dependent on how the EU Options are set in the PI Advanced Features dialog box. The default value is 0.

- If the PI is set up for a **Rate (Max Rollover)**, then the Current Rate is the EU Value.
- If the PI is set up for an accumulator using **Today's Total (Max Rollover)**, then Today's Total is the EU Value.
- If the PI is set up for accumulator using **Running Total (Entered Rollover)**, the EU Value corresponds to the accumulated pulses for the contract day times the Conversion. The EU Value is compared to the value entered for the rollover maximum). If it is greater than or equal to this entered value, the EU Value here is reset to zero.

Refer to PI Advanced Features on page 4-30.

Units — A 10-character name for the engineering units assigned to the pulse input. Examples for a Rate Value: MCF/day, BBL/day, or gpm.

Scan Period — The amount of time between scans of the EU Value in second intervals. The default value is 1 second. Note that the rate calculation is performed based on the number of pulses counted during the scan interval divided by the time interval. To avoid highly fluctuating calculation results, there should typically be at least 10 pulses occurring between scans at low flow conditions. In addition, longer Scan Periods reduce the loading on the processor. For example, if a flow meter produces one pulse per second at low flow, then the Scan Period should be set to a minimum of 10 seconds.

For a pulse input implemented in a PI module, the input signal must be scanned often enough such that rollover in the module's 16-bit counter, which occurs at 65535, is not missed. For example, a 10 kHz input signal must be scanned at least every 6.5 seconds to register the value before rollover occurs.

Once the Scan Period is reached, the Accum'd Pulses, Pulses Today, Today's Total, Yesterday's Total, and Current Rate values update.

Conversion — This value is multiplied by the number of pulses to determine the Units as configured. This parameter is sometimes referred to as the "meter factor" for turbine meters. The default value is 1.

Accum'd Pulses — This is the value of the raw counts (accumulated pulses) as stored in an accumulated value counter that resides in the firmware. For each Scan Period, the GridBoss determines the number of raw counts that have occurred since the last Scan Period and adds them to the accumulated value counter. The accumulated value rolls over to zero after reaching 16,000,000 for a GridBoss. The default value is 0.

Pulses Today — This value accumulates raw pulses until Force End of Day or Contract Hour, then it zeros and starts over. The default value is 0.

Today's Total — This field reflects the total EUs accumulated since the most recent Contract Hour. Today's Total is reset to zero at Contract Hour. The default value is 0.

Yesterday's Total — This field reflects the total EUs accumulated during the most recent 24-hour period prior to the Contract Hour. Yesterday's Total is the previous day's total at Contract Hour. The default value is 0.

Current Rate — This is the value of the calculated rate as of the most recent scan expressed in EUs per unit of time. Time units are the same as selected by the Rate Period parameter. The Current Rate stores the calculated rate of the pulses, which is determined by using the Conversion, the Rate Period, the Scan Period, and the accumulated pulses. The **Conversion** parameter is interpreted as a pulse weight multiplier in terms of pulses/EU or in terms of EUs/pulse. The **Rate Period** can be one of three possibilities: EU/minute, EU/hour, or EU/day. The following shows the calculation of the Current Rate in two different ways:

1. If Conversion Mode = EUs/pulse, and Rate Period = EU/min, then
   Current Rate = (accumulated pulses * Conversion) / (Scan Period * conversion from seconds to min)
2. If Conversion Mode = pulses/EU, and Rate Period = EU/hour, then
   Current Rate = (accumulated pulses / Conversion) / (Scan Period * conversion from seconds to hour)

Scanning — These options let you enable or disable Scanning for this point. For the input to receive and process the field input, it must be Enabled. While Scanning is Enabled, Status indicates the input state. When Scanning is Disabled (Manual Mode), Status becomes a control for determining the state of the input to the GridBoss, overriding the field input and effectively placing the input into Manual Mode. If Alarming is Enabled, an alarm is generated when Scanning is Disabled.

Alarming — These options let you enable or disable Alarming for this point. If you enable alarms, the alarms are configured and displayed in the Alarms pop-up window. Alarms are also logged to the Alarm Log. To optimize processor time, alarms should be Enabled only when necessary. If you disable alarms, no alarm generates for this point, regardless of the Alarm configuration.

Active Alarms — Indicates if alarms are set or not.

The Active Alarms field indicates any alarm currently activated. For example, “Low Low” might appear to indicate that value of a PI is below the LoLo Alarm limit.

Even if you do not set all the alarms, check and adjust the value of each one so false alarms do not generate.

Alarms — Refer to page 4-28.

Advanced Features — Refer to page 4-30.

After configuring a point, press (F8)Save and use “Write to Internal Config Memory” in the GridBoss Flags display to save I/O configuration to programmable ROM in case you must perform a Cold Start. Refer to Section 9.

4.6.1 Pulse Input Alarms

When you press the **Alarms** pushbutton in the Pulse Inputs screen shown in Figure 4-19, a dialog box appears that lets you configure the alarms for this pulse input. For all pulse inputs, you can configure RBX Alarming and view Active Alarms. A Manual Mode alarm is set in the Alarm Log when the PI is placed into Manual Mode (Scanning Disabled). Refer to Figure 4-20.

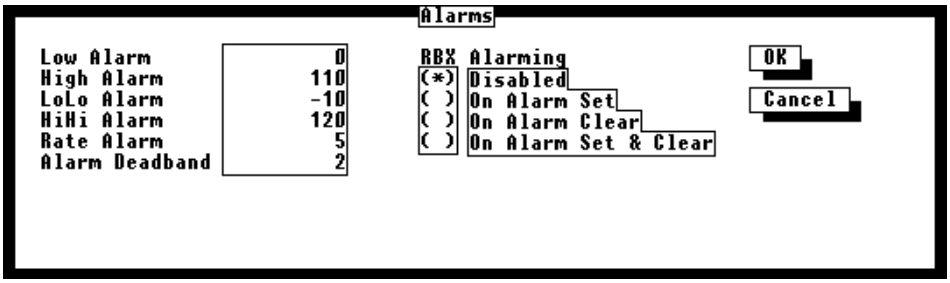

Figure 4-20. Pulse Input Alarms

Low Alarm — The limit value, in engineering units, to which the input must fall to generate a low alarm. The alarm is generated if the Value is less than or equal to the Low Alarm input for the PI. The default value is 10.

High Alarm — The limit value, in engineering units, to which the input must rise to generate a high alarm. The alarm is generated if the Value is greater than or equal to the High Alarm input for the PI. The default value is 100.

LoLo Alarm — The limit value, in engineering units, to which the input must fall to generate a low low alarm. The value is set lower than the Low Alarm. The default value is 0.

HiHi Alarm — The limit value, in engineering units, to which the input must rise to generate a high-high alarm. The value is set higher than the High Alarm. The default value is 110.

Rate Alarm — The value, in engineering units, that represents the maximum amount of change allowed between Scan Period updates. Refer to PI Scanning. If the change is equal to, or greater than this value, an alarm is generated. To disable the Rate Alarm without disabling the other alarms, the Rate Alarm EU value must be set greater than the Span of the PI. The default value is 5.

Alarm Deadband — The value, in engineering units, that is an inactive zone above the Low Alarm limits and below the High Alarm limits. The Alarm Deadband provides a range (±) that the Value in EU may move between without causing another alarm when the EU Options is set up for a Rate (Max Rollover). **Otherwise, the Alarm Deadband serves as the Rollover Maximum.** The purpose of an Alarm Deadband is to prevent the alarm from being set and cleared continuously when the input value is oscillating around the alarm limit. This also prevents the Alarm Log from being over-filled with data. The default value is 2.

RBX Alarming — RBX Alarming allows you to send a Report-by-Exception alarm to the Host when the point alarm condition is met.

Disabled – Select Disabled under RBX Alarming to turn this option OFF. This is the default value.

On Alarm Set – When the point enters an alarm condition, the GridBoss generates a Report-by-Exception message to the Host.

On Alarm Clear – When the point leaves an alarm condition, the GridBoss generates a Report-by-Exception message to the Host.

On Alarm Set & Clear – In either condition, an RBX message generates to the Host. Note that RBX Alarming also requires the communications port to be properly configured.

4.6.2 PI Advanced Features

When you press the **Advanced Features** pushbutton in the Pulse Input screen shown in Figure 4-19, a dialog box appears that lets you configure features such as EU Options, Rate Period, and Conversion for the pulse input. Refer to Figure 4-21.

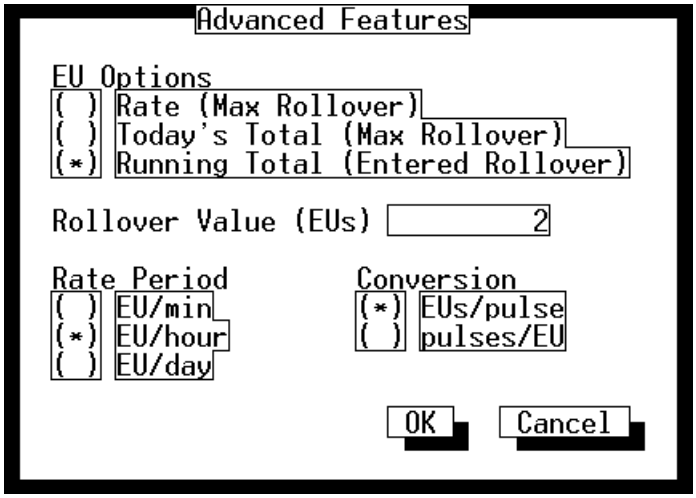

Figure 4-21. Pulse Inputs Advanced Features

EU Options — Select the type of EU Option for the type of Pulse Input and the action for the accumulator mode. Different engineering unit options are available for pulse inputs. The operating mode of each selection is:

Rate (Max Rollover) — PI Value in EUs corresponds to the pulses per scan times the Rate Period times the Conversion factor. PI Value in EUs is cleared at Contract Hour. Today's Total specifies the total EUs accumulated today. At Contract Hour, this value is transferred to Yesterday's Total, and Today's Total is cleared.

Today's Total (Max Rollover) — PI Value in EUs corresponds to the accumulated pulses today times the Conversion factor. Today's Total specifies the total EUs accumulated today. At Contract Hour, this value is transferred to Yesterday's Total, and Today's Total is cleared.

Running Total (Entered Rollover) — The PI Value in EUs corresponds to the accumulated pulses today times the Conversion factor. If the PI Value in EUs exceeds the rollover EU value, it is cleared. The PI Value in EUs is not cleared at Contract Hour. Today's Total specifies the total EUs accumulated today. At Contract Hour, this value is transferred to Yesterday's Total, and Today's Total is cleared.

Rollover Value (EUs) — When Running Total (Entered Rollover) is selected in the EU Options field, enter a number in EUs (not pulses) to specify when the rollover should occur.

Rate Period — Three different time bases or periods can be selected to perform the rate calculation. These periods are minutes, hours, or days.

EU/Min — Calculation based on EU minute totals.

EU/Hour — Calculation based on EU hourly totals.

EU/Day — Calculation based on EU day totals.

Conversion — Specifies how the number entered in the Conversion field on the main PI screen is used.

EUs/Pulse — The specified number of engineering units (typically fractional parts, such as 0.01) are registered for each pulse.

Pulses/EU — This is the inverse of EUs/Pulse. Here, the specified number of pulses (such as 100) is counted to register as one engineering unit.

4.7 INPUT AND OUTPUT POINT NUMBERS

Table 4-1 lists the point numbers associated with all input and outputs and where they are physically located.

Table 4-1. Input and Output Point Numbers

Analog Input	Analog Output	Discrete Input	Discrete Output	Pulse Input
A1 – SM Line Press A2 – SM Line Press A3 – RTD B2 – I/O Card B3 – I/O Card B4 – I/O Card E1 – Battery E2 – Charge In E3 – Spare E4 – Spare E5 – Battery Temp	B1– I/O Card	B7 – I/O Card B8 – I/O Card B9 – I/O Card B10 – I/O Card Note: B9, B10 and B11, B12 can be either a DI or a PI but not both.	A4 – Spare B5 – I/O Card B6 – I/O Card	A5 – Pulse Count A6 – Pulse Count B11 – I/O Card B12 – I/O Card Note: B9, B10 and B11, B12 can be either a DI or a PI but not both.

SECTION 5 — THE DATA MENU

5.1 SCOPE

This section describes the Data Menu and how to configure a GridBoss for Function Sequence Tables (FSTs), Softpoints, Radio Power Control, Opcodes, and front-panel displays.

This section contains the following information:

Information	Section	Page Number
FST	5.2	5-2
FST Parameters	5.2.1	5-2
FST Advanced Features	5.2.2	5-4
FST Editor	5.2.3	5-5
Soft Points	5.3	5-6
Radio Power Control	5.4	5-7
Opcode Setup	5.5	5-11
User List Setup	5.6	5-13

5.2 FST

Select Data from the menu bar and then choose FST (Function Sequence Table). You can then select either the FST Editor to create or alter an existing FST, or you can select FST Register to create or monitor an FST Register point. FST functions allow you to define and perform a set of specific actions to be taken when a set of conditions exists. FSTs are typically specific to your installation. For example, an FST may be written that would be used as an emergency shutdown control when dangerous flow occurs or in any similar application that requires logic sequencing capability.

An FST defines the input-to-output relationships in the GridBoss through a set of user-defined instructions, called functions. Functions define a specific sequence of actions to be performed. The sequence of functions is executed at the frequency defined in the Timer parameter fields. The functions are normally executed in the order of the sequence; however, the sequence may be altered by certain decision-making functions such as if/then statements, loops, or comparison values you establish.

One FST may be configured in a GridBoss unit. The FST may consist of as many functions as can fit into the memory reserved for the FST. Reserved memory is pre-determined by the GridBoss. An FST is built from a library of commands that provide mathematical and logical operations, database access operations, testing, and branching operations, and control-related operations. For information on library commands, refer to the *Function Sequence Table User Manual (Form A4625)*.

5.2.1 FST Parameters

Select FST in the Data menu and then select FST Register to display the screen shown in Figure 5-1. The FST Register option is used to monitor the operation of FST Parameters and to enter initial Register values without going into the Monitor function of the FST Editor utility. When you select FST Register, a screen appears showing the various FST Parameters that can be monitored or initialized.

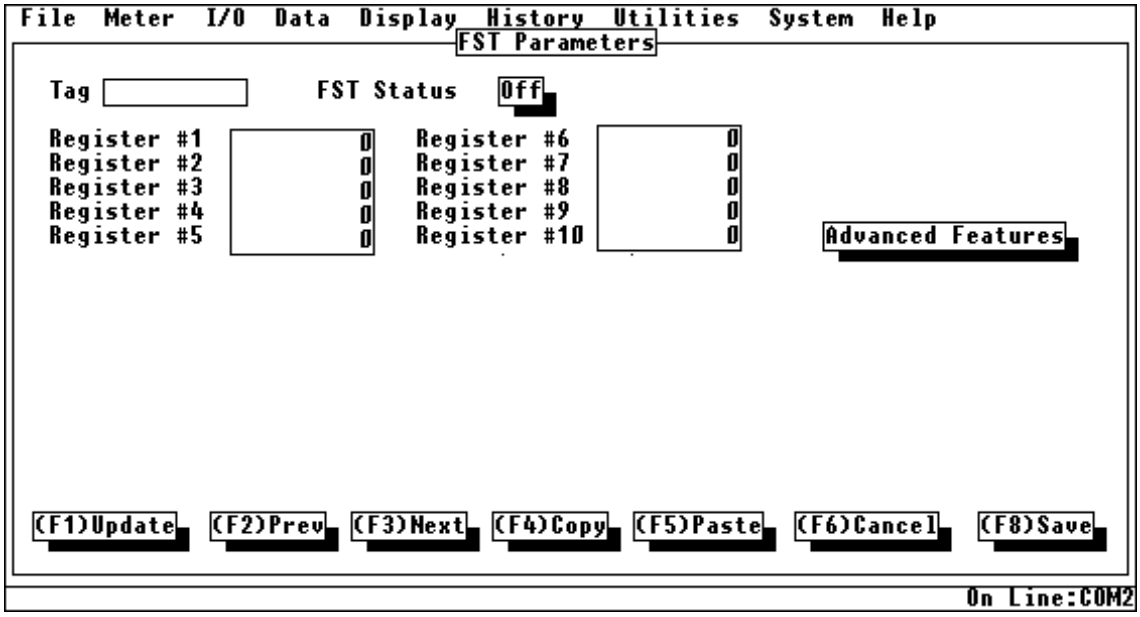

Figure 5-1. FST Parameters (FST Registers Point)

Tag — The 10-character name identifying the FST Register point.

FST Status — The current status, ON or OFF, of the FST associated with this FST Registers point. You can turn the associated FST ON or OFF by setting this pushbutton and pressing (F8)Save.

Register #1 to #10 — Ten floating-point registers are used for global storage for the FST. The global Registers can store calculated or manually-entered values and can pass data from one table to another. These Registers may be read from, or written to, by any FST and are referred to as Register # 1 to Register # 10.

(F1)Update — Requests the most recent values from the GridBoss to update the current display.

(F2)Prev — Displays the previous FST Parameters screen.

(F3)Next — Displays the next FST Parameters screen.

(F4)Copy — Copies the values of the current display.

(F5)Paste — Places the values of the copied display into the current display.

(F6)Cancel — Cancels all actions since the last save and closes the currently selected display screen.

(F8)Save — Saves the configuration values in the current display to the GridBoss.

5.2.2 FST Advanced Features

When you use **Advanced Features** pushbutton in the FST Parameters screen shown in Figure 5-1, a dialog box appears with a number of additional parameters that can be viewed or configured in the FST Register point. Refer to Figure 5-2.

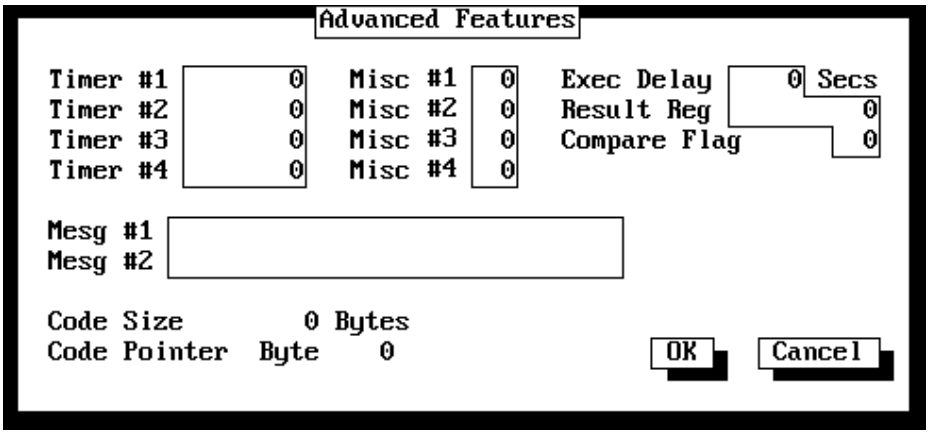

Figure 5-2. FST Advanced Features

Timer #1 to #4 — These four timers, when set greater than "0," decrement by 1 every 100 milliseconds. When the timer reaches "0," the FST branches to the label specified in the Timer function. The Timer values are determined by the FST. The sequence of functions is executed at the frequency defined in the Timer parameter fields.

Misc #1 to #4 — Four unsigned integers (8-bit bytes with valid decimal values of 0 to 255) that are used for global storage by the FST.

Exec Delay — The delay between the execution of successive FST commands.

Result Reg — The results register or accumulator. The results register is a floating point value that is passed between functions. As the sequence of functions executes, two memory locations store intermediate results from one function to the next. The Results Register (RR), stores a floating-point or analog value sometimes referred to as the signal value analog (SVA). The other location stores a discrete value called the signal value discrete (SVD) as the Compare Flag parameter. Depending on the function, the Results Register and the Compare Flag may be loaded, stored, tested, modified, or left unchanged.

Compare Flag — The Compare Flag is often referred to as the signal value discrete (SVD). The compare flag is an 8-bit integer representing the numbers 0 through 255. The Results Register, stores a floating-point or analog value, sometimes referred to as the signal value analog (SVA). The Compare Flag stores a discrete value called the signal value discrete (SVD). Depending on the function, the Results Register and the Compare Flag may be loaded, stored, tested, modified, or left unchanged.

Mesg #1 and Mesg #2 — 30-character field for storing a message. The message can be displayed by the GridBoss Local Display Panel.

Code Size — The number of bytes used by the FST, equivalent to the end pointer position minus the start pointer position.

Code Pointer — Indicates the location in GridBoss memory of the next function to be executed. There are 0 to 7999 storage locations for functions in the GridBoss. One storage location is used for each byte that makes up the function.

5.2.3 FST Editor

Select FST in the Data menu and then select FST Editor to display the screen shown in Figure 5-3. Selecting the FST Editor causes GRIDLINK to suspend operation and load into memory the FST500.EXE program. If the FST500.EXE program is not in the current working directory, the file is not found and control is passed back to GRIDLINK. For information on using the FST Editor, see the *Function Sequence Table User Manual (Form A4625)*.

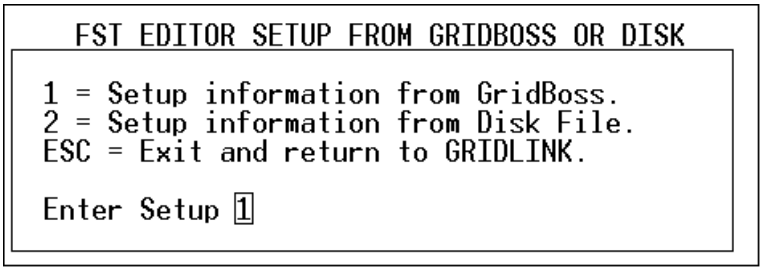
FST EDITOR SETUP FROM GRIDBOSS OR DISK
1 = Setup information from GridBoss.
2 = Setup information from Disk File.
ESC = Exit and return to GRIDLINK.
Enter Setup 1

Figure 5-3. FST Editor

5.3 SOFT POINTS

Select Data from the menu bar and then choose Soft Points. Softpoints are storage areas for data or are used to pass configuration information to FSTs. For example, a softpoint may be used to store the results of a specified calculation by an FST or to store an intermediate result of a specified value acquired by an FST. Softpoints consist of a Tag identifier, one integer value, and twenty floating values. There are 16 softpoints are available. Refer to Figure 5-4.

Softpoint configuration is saved to programmable ROM when the **Write to Internal Config Memory** is activated from the GridBoss System Flag display.

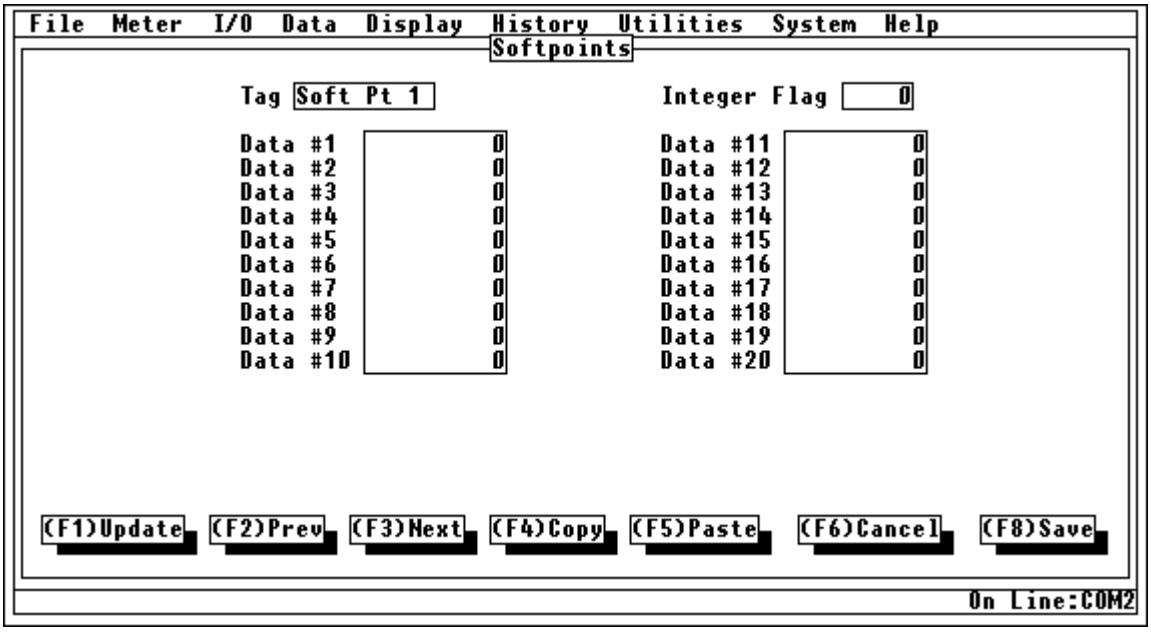

Figure 5-4. Softpoints

Tag — A 10-character identification name for the Softpoint.

Integer Flag — A 16-bit unsigned integer value. This value is typically used as a flag to denote the validity of the floating point data or as a counter. The value is under control of an FST or user program.

Data #1 to #20 — The data fields formatted for floating point data. The values in the fields are under control of, or used by, FSTs and user programs. For example, an FST may write an intermediate result of a value it acquired and the Host program may poll the GridBoss for that information.

(F1)Update — Requests the most recent values from the GridBoss to update the current display.

(F2)Prev — Displays the previous Softpoint.

(F3)Next — Displays the next Softpoint.

(F4)Copy — Copies the values of the current display.

(F5)Paste — Places the values of the copied display into the current display.

(F6)Cancel — Cancels all actions since the last save and closes the currently selected display screen.

(F8)Save — Saves the configuration values in the current display to the GridBoss.

5.4 RADIO POWER CONTROL

Select Data from the menu bar and then choose Radio Control. A display appears similar to the one shown in Figure 5-5. Battery power is conserved by cycling power to the radio or cellular telephone only when power is required. Radio power is controlled at the switched power terminals on a EIA-232 communications card.

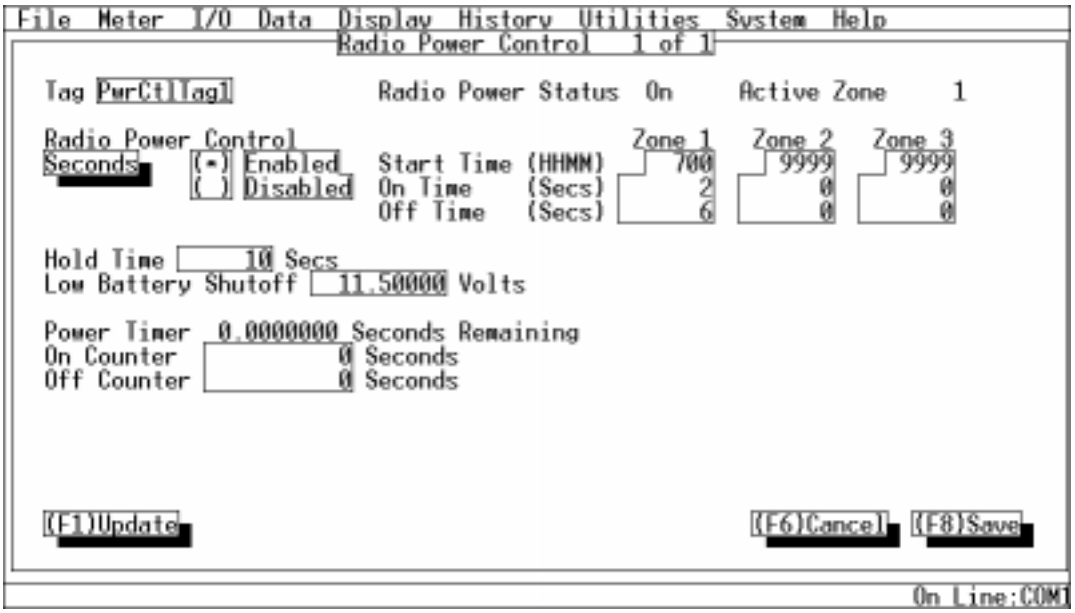

Figure 5-5. Radio Control

Radio power is controlled by the DTR signal through the COM1 port on an EIA232 communications card.

Two modes of Power Control are possible: Seconds and Minutes. In **Seconds** mode, the time base for the timers is in 0.1 second increments, primarily used with radios. In **Minutes** mode, the time base for the timers is in one-minute increments, primarily used with cellular telephones.

For each Radio Control point, the power cycling can be configured to automatically change three times a day. During each of these three periods, called Zone 1, Zone 2, and Zone 3, the ON and OFF times can be set up to operate at various intervals to conserve battery power.

Figure 5-6 is a graphical depiction of how the power control operates within each time "zone."

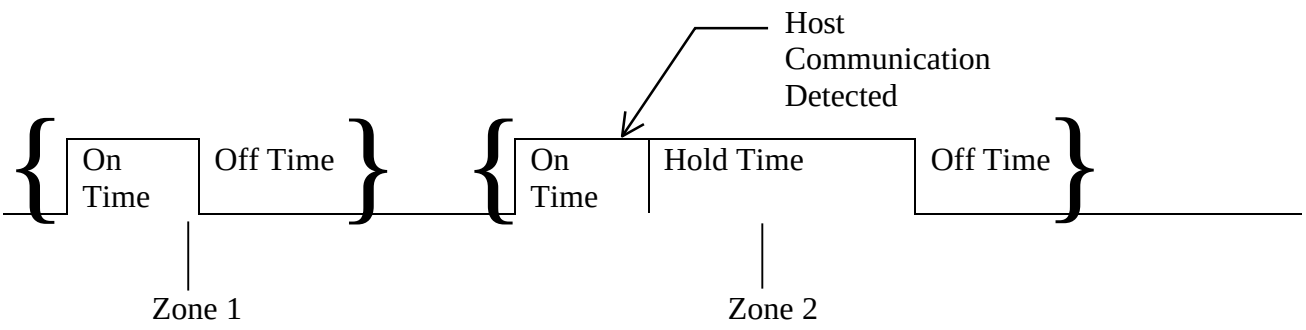

Figure 5-6. Radio Power Control Timing

During the ON time:

- Receive interrupts are enabled on the COM port.
- The power output is switched to **ON**.
- Communications may occur.

During the OFF time:

- Receive interrupts are disabled on the COM port.
- The power output is set to **OFF**.
- Communications may not occur.

If communications occur during the ON time, the ON time is extended by the Hold Time. The power output remains ON and receive interrupts remain enabled for the duration of the Hold Time.

When the Radio Power Control parameter is Enabled, radio power cycling is activated. The Low Battery Shutoff parameter allows power cycling to be automatically disabled whenever the input voltage to the GridBoss falls below the specified threshold.

Tag — You can enter a 10-character name to identify this power control point with its respective communications port. The default value is PwrCtlTag1.

Radio Power Status (Read Only) — Indicates the current status of the Power Control function of ON, OFF, or RBX.

Active Zone — Indicates which zone is currently activated for determining the Start Time, On Time, and Off Time. The default value is 1.

Seconds / Minutes — Two modes of Power Control are possible: Seconds and Minutes. Press the pushbutton to switch between Seconds and Minutes. In **Seconds** mode, the time base for the timers is in 0.1 second increments, primarily used with radios. In **Minutes** mode, the time base for the timers is in one-minute increments, primarily used with cellular telephones. The default value is seconds.

Radio Power Control — These options let you activate or deactivate the Radio Power Control function and set the time configuration. The following options are available.

- **Enabled (Seconds)** – Select Enabled (Seconds) to have Radio Power Control calculated in seconds. In Seconds mode, the time base for the timers is in 100 millisecond (0.1 second) increments and is primarily used with radios.
- **Enabled (Minutes)** – Select Enabled (Minutes) to have Radio Power Control calculated in minutes. In Minutes mode, the time base for the timers is in 1-minute increments and is primarily used with cellular telephones.
- **Disabled** – Select Disabled to deactivate Radio Power Control.

Start Time — Time in hours and minutes (HHMM) that the respective zone begins. Time is expressed in local time, 24-hour clock. For example, “1500” under Zone 2 means that the associated On Time and Off Time are used beginning at 3:00 p.m. The default value for Start Time 1 is 700. The default value for Start Time 2 and Start Time 3 is 9999. 9999 indicates that the zone is disabled.

On Time — Time during a power cycle when the output is in the ON state (in seconds, unless the Minutes mode has been enabled) for the respective zone. Note that the time is accurate to 0.2 seconds, rounded up. For example, “6.5” under Zone 1 means that the power will be on for 6.6 seconds during each cycle that occurs in Zone 1. The default value for On Time 1 is 2. The default value for On Time 2 and Start Time 3 is 0.

Off Time — Time during a power cycle that the output is in the OFF state (in seconds, unless the Minutes mode has been enabled) for the respective zone. Note that the time is accurate to 0.2 seconds, rounded up. For example, “18.5” under Zone 1 means that the power will be off for 18.6 seconds during each cycle that occurs in Zone 1. The default value for Off Time 1 is 6. The default value for Off Time 2 and Off Time 3 is 0.

Hold Time — Time that the output remains ON after detection of communications activity (in seconds, unless the Minutes mode has been enabled). This value applies to all zones. Note that the time is accurate to 0.2 seconds, rounded up. When communications occur during the On Time, the On Time is extended by the Hold Time. The DTR signal remains ON, the receive interrupts remain enabled, and the Discrete Output (if used) remains in the ON state. The default value is 10.

Low Battery Shutoff — Enter a value that specifies the voltage at which Power Control will be automatically disabled. The voltage being sensed is the Power In (diagnostic analog input E2) or Battery voltage (diagnostic analog input E1). The Low Battery Shutoff parameter allows power cycling to be automatically disabled whenever the input voltage to the GridBoss falls below the specified threshold. The default value is 11.5 volts.

Power Timer — Counts down the amount of time (On Time, Off Time, or Hold Time) that the Radio Control is currently using. The value is the number of seconds or minutes remaining, as indicated. Note that the time is accurate to ±0.2 seconds. The default value is 0.

On Counter — Value indicating the cumulative time that the Power Control has been in the ON state. The default value is 0.

Off Counter — Value indicating the cumulative time that the Power Control has been in the OFF state. The default value is 0.

Make sure that if a report-by-exception (RBX) message needs to be sent to the Host computer, the radio power will be turned on accordingly. The radio power should stay on long enough to allow the GridBoss to receive a response back from the Host. Refer to Section 9 concerning RBX.
At least three requests should be present during the On Time that a radio is active. Some of the On Time is also used by the radio during power-up initialization of the receiver, causing part of the On Time to be unavailable for receiving requests. Refer to Table 5-1 for a typical configuration of the Radio Control feature for a GridBoss and a Host with a 25% duty cycle.

Table 5-1. Typical Power Control and Host Configuration

GridBoss Radio Power Control Enabled (Seconds mode)	On Time = 2 seconds
	Off Time = 6 seconds
Host	Key-on Delay = 250 milliseconds
	Key-off Delay = 10 milliseconds
	Number of retries = 13
	Time between retries = 350 milliseconds

After configuring the Radio Control points, press (F8)Save and save the configuration to programmable memory using the “Write to Internal Config Memory” in the GridBoss System Flag screen.

5.5 OPCODE SETUP

Select Data from the menu bar and then choose Opcode Setup. A screen appears as shown in Figure 5-7. The Configurable Opcode utility is used by certain Host computers to group data for more efficient communications. The data for the Opcode is normally configured by the Host through the communications channel. This utility is used for checking and editing Opcode configuration. Care must be taken to assure that any changes will not corrupt data for the Host.

A Host device uses Opcodes **request** information from the GridBoss. If the request requires a response, a value or information may then be **sent back** to a Host device. The Opcode value may also be a **command** that causes the GridBoss to perform an action or a set of actions, such as collecting the current Pulse Input values and then sending the data back to the Host.

When the Host device desires to know a specified value or parameter stored in the GridBoss, an Opcode value is sent to the GridBoss specifying the value or parameter required by the Host. The Opcode value may be a command which causes the GridBoss to perform a desired action such as changing the Tag for a Analog Input Point Number A3 or using Opcode 8 to request the GridBoss to set the Time parameter in the Clock. In this case, the GridBoss performs the action but does not return a value to the Host.

CAUTION

Do not alter the default Opcode Point Definitions.

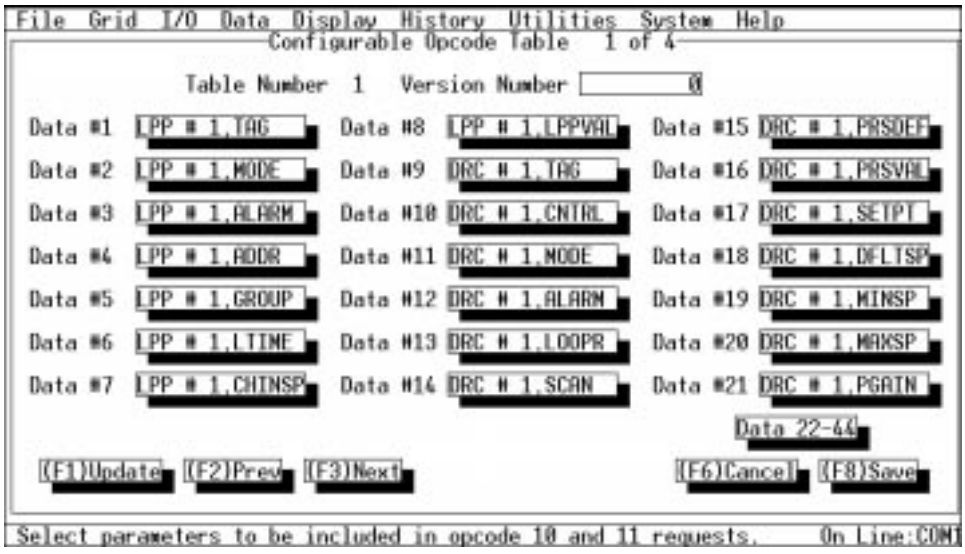
File Grid I/O Data Display History Utilities System Help
Configurable Opcode Table 1 of 4
Table Number 1 Version Number 0
Data #1 LPP # 1,TAG
Data #2 LPP # 1,MODE
Data #3 LPP # 1,ALARM
Data #4 LPP # 1,ADDR
Data #5 LPP # 1,GROUP
Data #6 LPP # 1,LTIME
Data #7 LPP # 1,CHINSP
Data #8 LPP # 1,LPPVAL
Data #9 DRC # 1,TAG
Data #10 DRC # 1,CNTRL
Data #11 DRC # 1,MODE
Data #12 DRC # 1,ALARM
Data #13 DRC # 1,LOOPR
Data #14 DRC # 1,SCAN
Data #15 DRC # 1,PRSDEF
Data #16 DRC # 1,PRSVAL
Data #17 DRC # 1,SETPT
Data #18 DRC # 1,DFLTSP
Data #19 DRC # 1,MINSP
Data #20 DRC # 1,MAXSP
Data #21 DRC # 1,PGAIN
Data 22-44
(F1)Update
(F2)Prev
(F3)Next
(F6)Cancel
(F8)Save
Select parameters to be included in opcode 10 and 11 requests.
On Line:COM1

Figure 5-7. Configurable Opcode Table

Table Number — This field shows a Table Number for the Opcode screen. Table Number is a number between 1 and 4. Access other Opcode tables by using the (F2)Prev and (F3)Next keys.

Version Number — This field defines a Version Number for the data configured in the Opcode screen. If the configuration is changed, then the Version Number should be updated. This location can also be used as a sequence number by the Host computer to make sure that read/write communications are operating properly. The Version Number is a floating point number.

Data #1 to #44 — The Data fields contain the Point Type, Point/Logical Number, and Parameter of the data for this position in the Transmit or Receive Buffer. Pushbuttons, which are initially labeled Undefined, are used as an aid for the configuration of the Data fields. Opcode 10 is used by the Host to specify a specific Data field and request the information contained in that Data field.

Data 22-44 — Use the pushbutton labeled Data 22-44 to access the rest of the Data fields.

NOTE

Interpret the information on the Data pushbutton (for example, AIN A 3, EU) in the following manner. The first part is a three-character mnemonic (in this example, "AIN" means Analog Input) that indicates the Point Type. The second part (such as "A 3") indicates the Point Number. The third part is a mnemonic indicating the selected Parameter (such as EU for the Filtered Engineering Units Parameter).

Refer to Figure 5-9 concerning the point definition.

5.6 USER LIST SETUP

Select Data from the menu bar and then choose **User List Setup**. A screen appears that lets you assign up to 16 parameters for viewing on the GridBoss front-panel display, which shows each parameter for two or three seconds before continuing on to the next one in the sequence. Refer to Figure 5-8.

The built-in Liquid Crystal Display (LCD) in the GridBoss provides the ability to look at data and configuration parameters while on site without using the local operator interface (LOI) and a personal computer (PC). The LCD display is factory-mounted directly to the Main Electronics Board and visible through the window on the front panel. Through this display, you can view pre-determined information stored in the GridBoss.

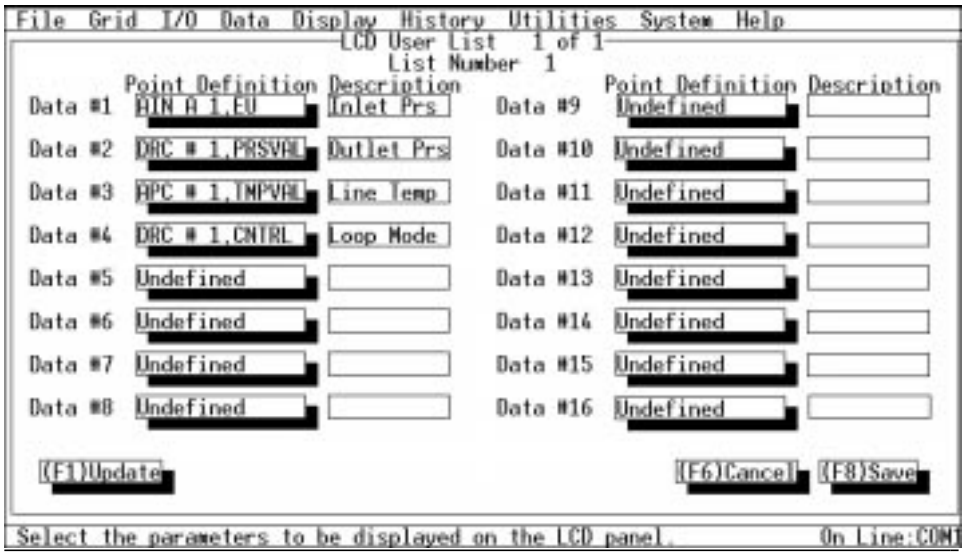
File Grid I/O Data Display History Utilities System Help
LCD User List 1 of 1
List Number 1
Point Definition Description
Point Definition Description
Data #1 AIN A 1,EU Inlet Prs
Data #9 Undefined
Data #2 DRC # 1,PRSVAL Outlet Prs
Data #10 Undefined
Data #3 RPC # 1,TMPVAL Line Temp
Data #11 Undefined
Data #4 DRC # 1,CNTRL Loop Mode
Data #12 Undefined
Data #5 Undefined
Data #13 Undefined
Data #6 Undefined
Data #14 Undefined
Data #7 Undefined
Data #15 Undefined
Data #8 Undefined
Data #16 Undefined
[F1]Update
[F6]Cance
[F8]Save
Select the parameters to be displayed on the LCD panel.
On Line:CONT

Figure 5-8. LCD User List

Point Definition — Press the **Point Definition** pushbuttons to define the point parameters you desire to view on the LCD display. “Undefined” indicates that no parameter has been specified. Refer to Figure 5-9.

NOTE

Interpret the information on the Point Definition pushbutton (for example, AIN A 3, EU) in the following manner. The first part is a three-character mnemonic (in this example, “AIN” means Analog Input) that indicates the Point Type. The second part (such as “A 3”) indicates the Point Number. The third part is a mnemonic indicating the selected Parameter (such as EU for the Filtered Engineering Units Parameter). Refer to Table 7-1 in Section 7, History Setup.

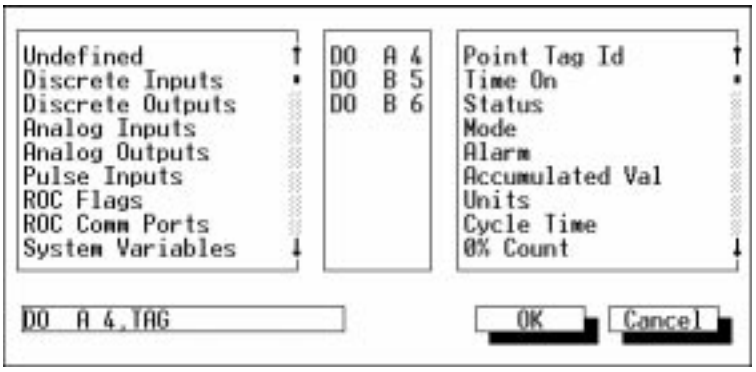

Figure 5-9. Point Definition

Description — Description of the parameter to be viewed on the LCD. The Description has a 10-character limit.

Data #1 to #16 — You may define up to 16 point definitions to be displayed in the User List on the LCD. The LCD displays the data at approximately three second intervals.

SECTION 6 — THE DISPLAY MENU

6.1 SCOPE

This section describes the Display menu of the GRIDLINK configuration software. The Display menu allows you to create customized displays, load a new display from a disk file, and monitor control loops and I/O points.

This section contains the following information:

Information	Section	Page Number
Custom Displays	6.2	6-1
New Display	6.2.1	6-1
Creating a Display Example	6.2.2	6-4
Adding Live Data to a Display	6.2.2.1	6-8
Copying Display Data	6.2.2.2	6-10
Display On Disk	6.2.3	6-12
Monitor	6.3	6-14
Monitor Discrete Input	6.3.1	6-14
Monitor Discrete Output	6.3.2	6-15
Monitor Analog Input	6.3.3	6-16
Monitor Analog Output	6.3.4	6-17
Monitor Pulse Input	6.3.5	6-18
Control Loop	6.3.6	6-19

6.2 CUSTOM DISPLAYS

The Display menu options provide choices for building new displays or for loading, running, and editing displays stored on disk.

6.2.1 New Display

Selecting Display from the menu bar and then choosing New Display allows you to create or edit displays as well as run the displays with “live” data. The displays can incorporate almost any information you wish to convey. One example is a graphical representation of the application that a GridBoss is monitoring and controlling. Another example is a display that monitors the GridBoss and adjusts commonly used parameters from a single screen. Refer to Figure 6-1.

NOTE

Press Edit to create or edit the screen display.

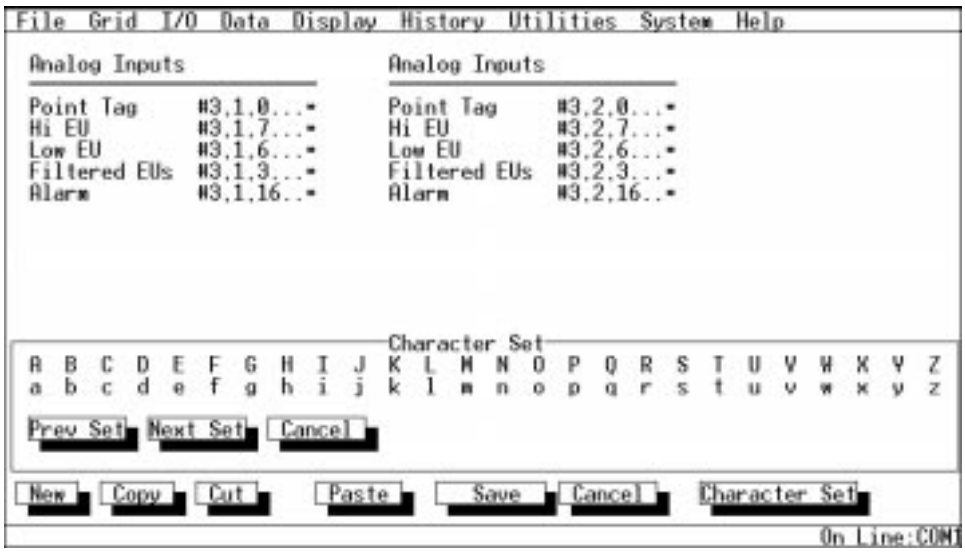
File Grid I/O Data Display History Utilities System Help
Analog Inputs
Point Tag #3,1,0...*
Hi EU #3,1,7...*
Low EU #3,1,6...*
Filtered EUs #3,1,3...*
Alarm #3,1,16..*
Analog Inputs
Point Tag #3,2,0...*
Hi EU #3,2,7...*
Low EU #3,2,6...*
Filtered EUs #3,2,3...*
Alarm #3,2,16..*
Character Set
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
Prev Set
Next Set
Cancel
New
Copy
Cut
Paste
Save
Cance
Character Set
On Line:COM1

Figure 6-1. GridBoss Display

Use New Display to create a new GridBoss display. Use the "#" key to enter a field representing "live" data. GridBoss displays can be created on or off line and saved to a disk file. The pushbuttons available at the bottom of the screen are:

New — Use this pushbutton to create a new display. **CAUTION: This pushbutton clears whatever display is currently on the screen, so be sure you have saved a display you want to keep before using this pushbutton.**

Copy — Use this pushbutton to copy a highlighted block of characters and fields within the display builder and to place the contents on the clipboard. Highlight by dragging the mouse over the desired area.

Cut — Use this pushbutton to delete a highlighted block of characters and fields within the display builder and place the contents on the clipboard. Highlight by dragging the mouse over the desired area.

Paste — Place the contents of the clipboard at the location of the cursor, and clear the clipboard. The cursor locates where the upper left corner of a block will be placed.

Save — Save the current display to a disk file. This stores a copy of the display to a file located on the computer. Use the extension `.DSP` (display) when you save the disk file. Refer to Figure 6-13.

Cancel — Cancel all actions since the last save and close the currently selected display screen.

Character Set — Show the character set currently selected for building the display. Eight different character sets are supported: two for upper and lower case alphabetical characters, and six for various types of graphical characters. Refer to Figure 6-2 through Figure 6-9. Press **Next Set** or **Prev Set** to select a character set.

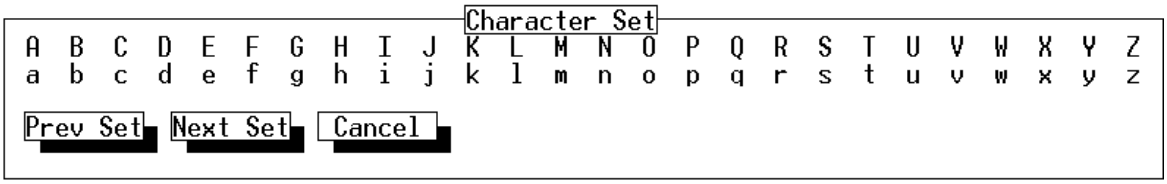

Figure 6-2. GridBoss Character Display (First Set)

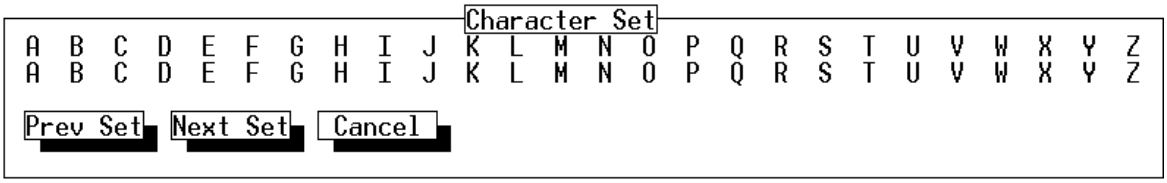

Figure 6-3. GridBoss Character Display (Second Set)

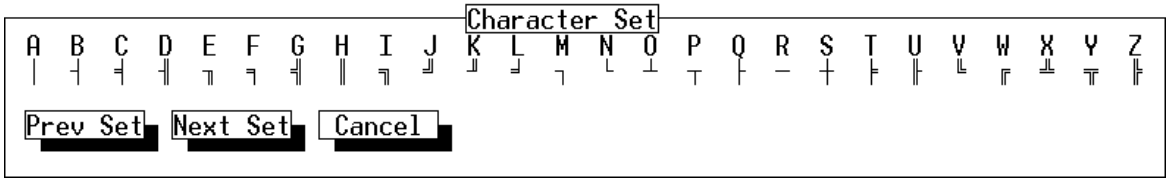

Figure 6-4. GridBoss Character Display (Third Set)

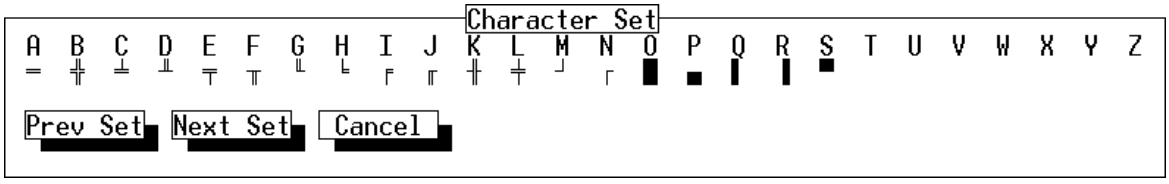

Figure 6-5. GridBoss Character Display (Fourth Set)

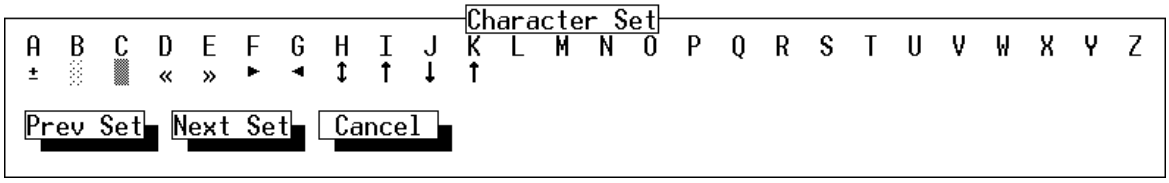

Figure 6-6. GridBoss Character Display (Fifth Set)

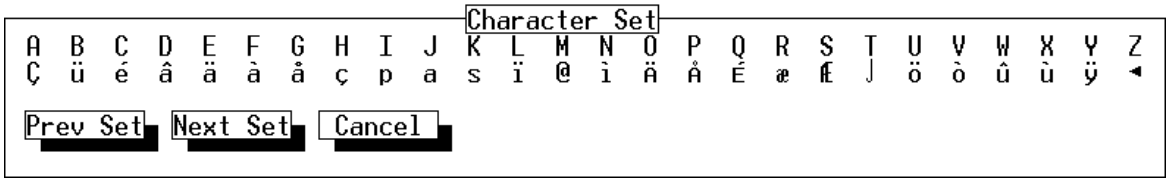

Figure 6-7. GridBoss Character Display (Sixth Set)

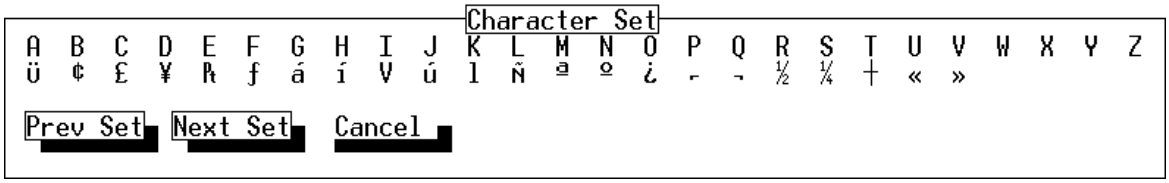

Figure 6-8. GridBoss Character Display (Seventh Set)

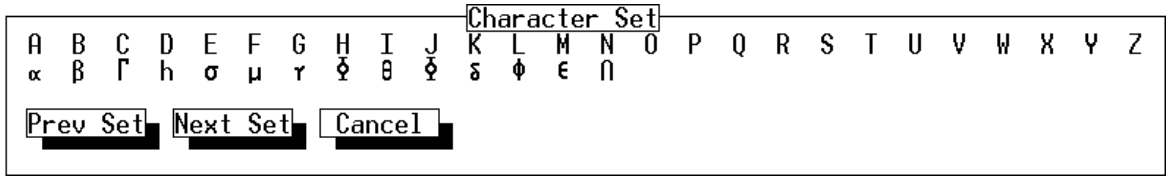

Figure 6-9. GridBoss Character Display (Eighth Set)

6.2.2 Creating a Display Example

The following is an example for setting up a display that monitors Analog Inputs for specific points in a GridBoss.

1. Select **New Display** from the GRIDLINK Display menu.
2. Press the **Character Set** pushbutton.
3. Press **Next Set** in the Character Set block to display the Character Set displayed in Figure 6-3.

4. Place the cursor in the top left corner of the screen as in Figure 6-10. To place your cursor in the display, position your mouse in the correct location and click.

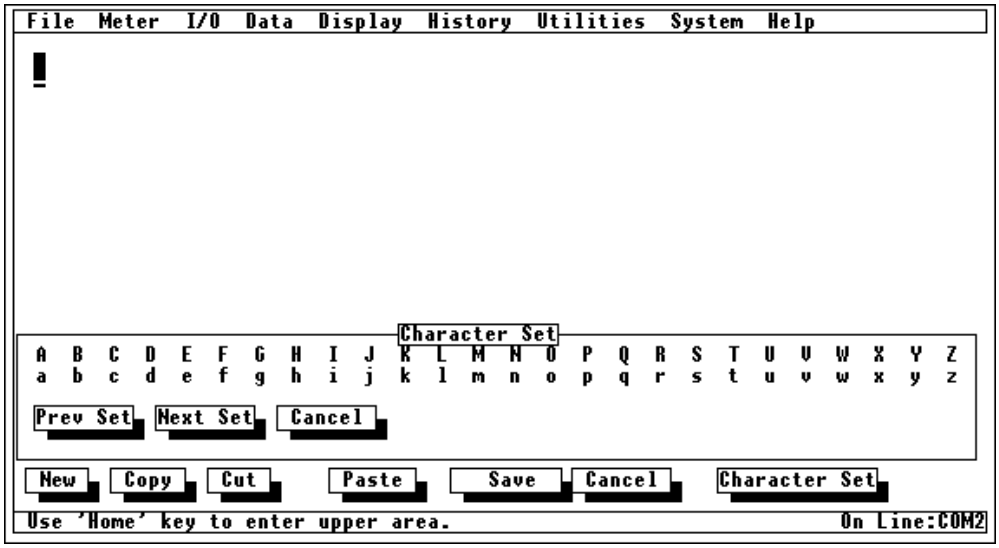
File Meter I/O Data Display History Utilities System Help
Character Set
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
Prev Set
Next Set
Cancel
New
Copy
Cut
Paste
Save
Cancel
Character Set
Use 'Home' key to enter upper area.
On Line:COM2

Figure 6-10. New Display Example 1

5. Type "**A**."
6. Press **Prev Set** in the Character Set block to display the lower case alphabet letters. Refer to Figure 6-2 or Figure 6-10.
7. Place your cursor to the right of the "**A**" you typed previously and type "**nalog**."
8. Press **Next Set** in the Character Set block to display the upper case alphabet letters again.
9. Place your cursor to the right of the "g" in Analog and type "**I**." Leave a space between the "g" and the "I." Refer to Figure 6-11.
10. Press **Prev Set** in the Character Set block to display the lower case alphabet letters.

11. Place your cursor to the right of the “I” and type “**nputs**.” Your screen should look like Figure 6-11.

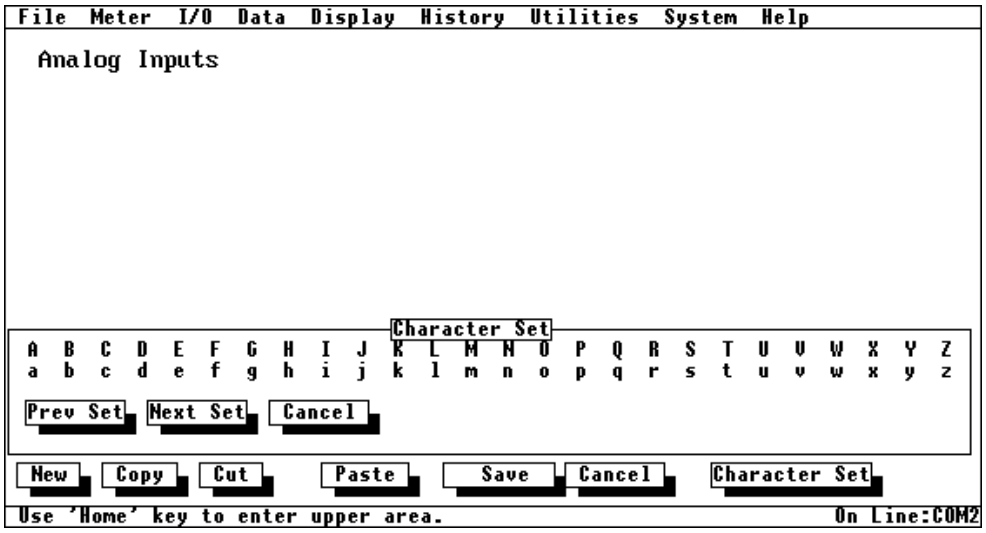
File Meter I/O Data Display History Utilities System Help
Analog Inputs
Character Set
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
Prev Set
Next Set
Cancel
New
Copy
Cut
Paste
Save
Cancel
Character Set
Use 'Home' key to enter upper area.
On Line:COM2

Figure 6-11. New Display Example 2

NOTE

To save time, you can create custom displays using all upper or lower case letters.

12. Press **Next Set** three times to display the Character Set in Figure 6-12.

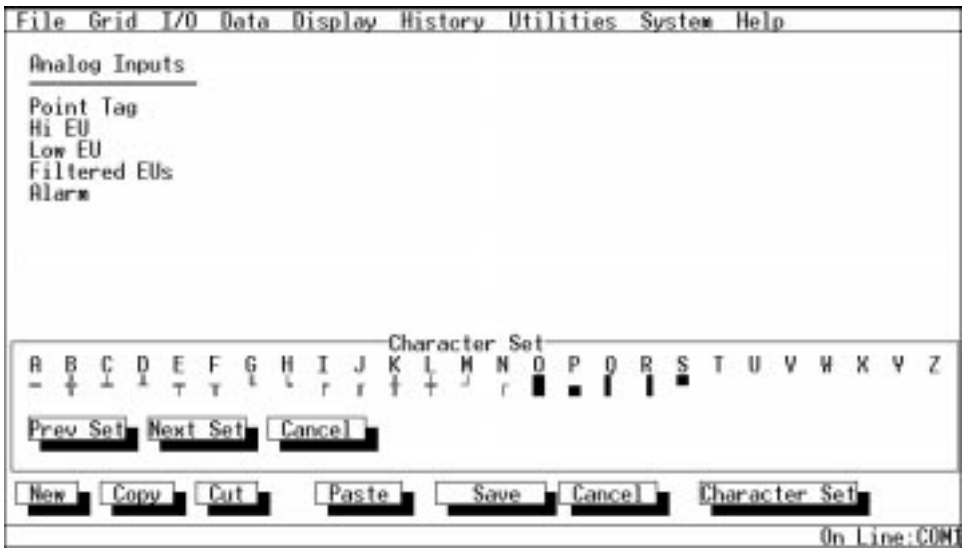

Figure 6-12. New Display Example 3

13. Place your cursor on the line below "Analog Inputs" and type "**a**" fourteen times to create a double horizontal line. The 4th Character Set (Figure 6-5) must be displayed to perform this action.
14. Change to the appropriate Character Sets and add the rest of the text to the screen shown in Figure 6-12.
15. Press **Save** and save the new display to a **File Name** as you desire.
16. Click **OK**. Refer to Figure 6-13.

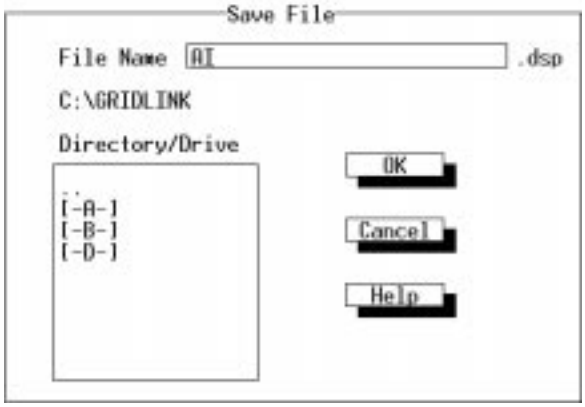

Figure 6-13. Save Display

6.2.2.1 Adding Live Data to a Display

The following is an example of adding live data to a display taken from a GridBoss. Refer to Figure 6-12.

1. Place your cursor to the right of the "**g**" in Point Tag.
2. Press the **Shift** and **#** keys at the same time on the keyboard. The value description window displays. Refer to Figure 6-14.

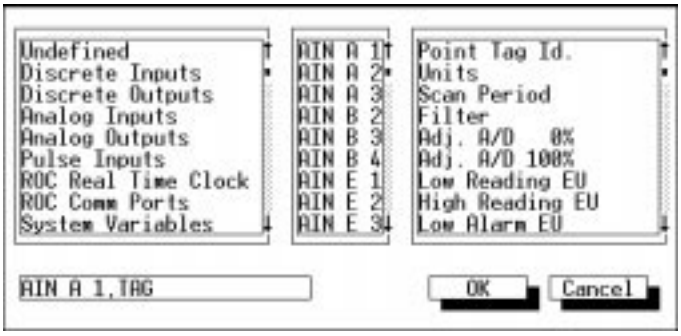

Figure 6-14. Value Description Window

3. Select **Analog Inputs**, **AIN A 1**, and **Point Tag Id.** and press **OK**.
4. Press **No** when the Change Data Verification dialog appears as in Figure 6-15. Selecting Yes in the Change Data Verification dialog allows users to manually change values while using the custom display.

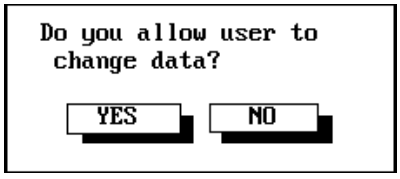

Figure 6-15. Change Data Verification Dialog

5. Place your cursor next to the Hi EU, Low EU, Filtered EUs, and Alarm fields and enter live values for each of these fields pressing **Shift** and **#** at the same time. Refer to Figure 6-16. The live readings to select from the point type value description window (Figure 6-14) include:
   - Point Tag – Point Tag Id
   - Hi EU – High Reading EU
   - Low EU – Low Reading EU
   - Filtered EUs – Filter
   - Alarm – Alarm

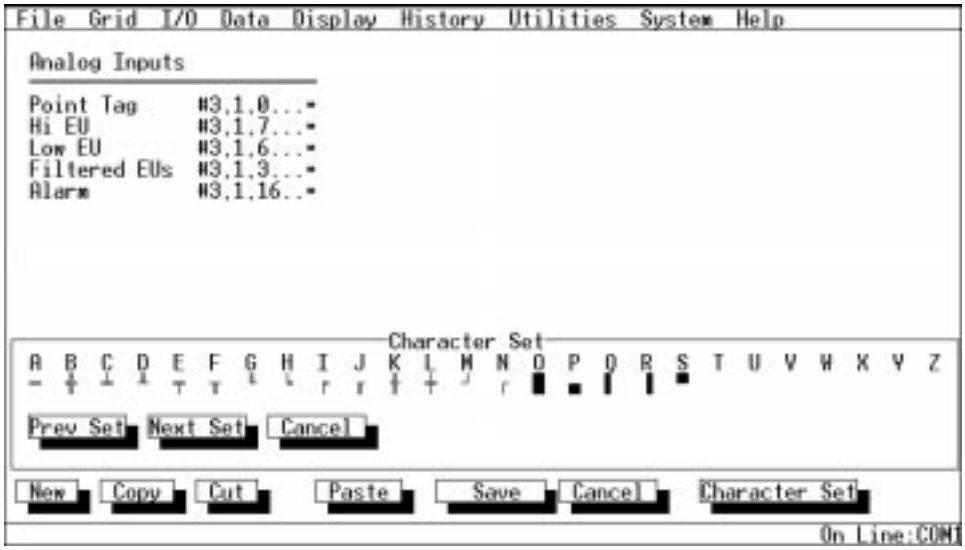

Figure 6-16. Displaying Live Data

6.2.2.2 Copying Display Data

It is usually quicker to copy data within a custom display than to re-create the work.

1. Place your cursor at the top left corner of the words “Analog Inputs.”
2. Click and drag your cursor to the bottom of the last live output value in the Alarm live value field. Refer to Figure 6-17.

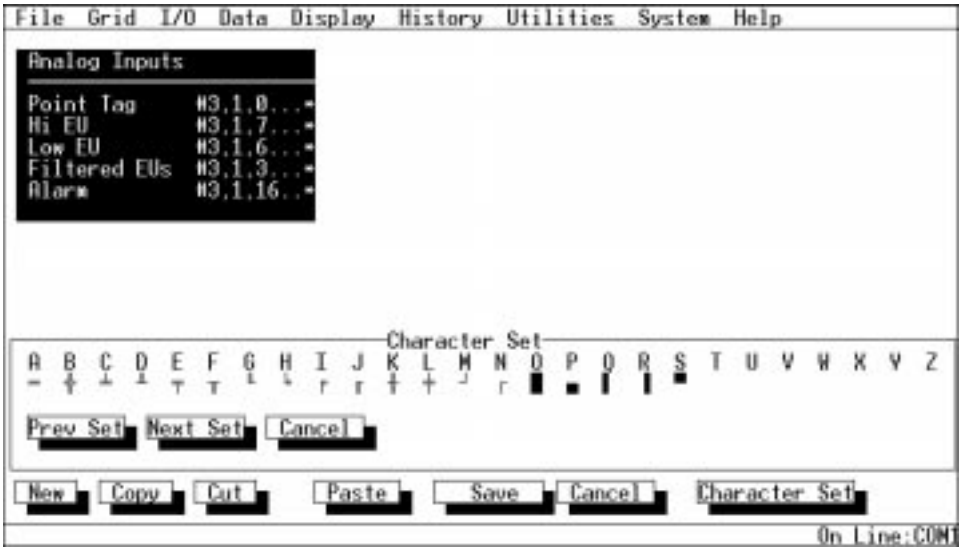

Figure 6-17. Copying Custom Display Data

3. Press the **Copy** pushbutton.

4. Place your cursor to the right of the current values and press **Paste**. Refer to Figure 6-18.

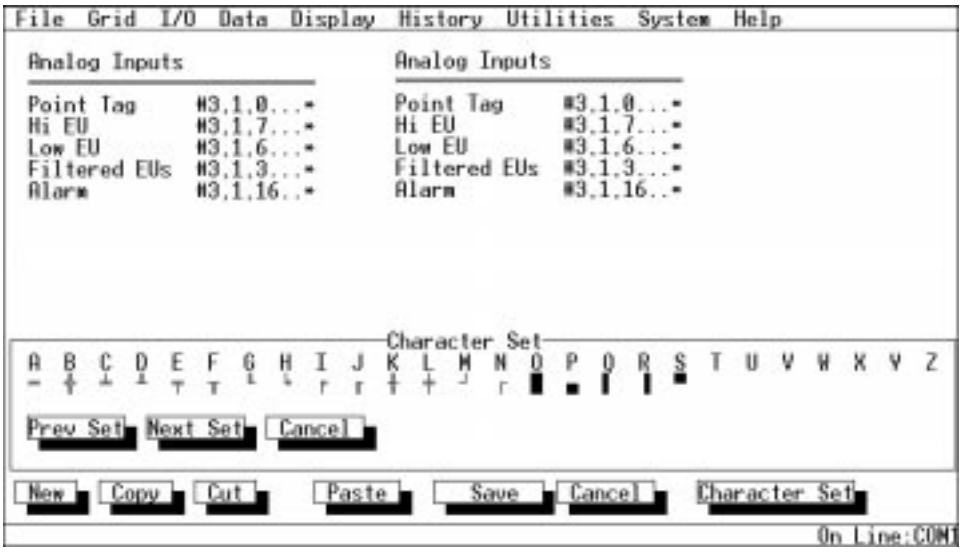

Figure 6-18. Pasting Custom Display Data

You can now change the live data values to display other points. Make minor alterations to the data you copied to create the custom display shown in Figure 6-19. You can type over existing characters by using the Insert key on your keyboard to make OVR (for overstrike) appear next to the Character Set pushbutton. If you press the Insert key again, the display toggles to INS (for insert characters).

To change live data values that you have copied, place your cursor in front of the live data field. Click and drag to select the live data field.

5. Highlight the live data values and press **Shift #** to view the value description window and make changes. Refer to Figure 6-14.
6. Select the new point or other data you desire to include in your custom display. This example uses Analog Input **AIN A 2**.
7. Press **OK**.
8. Complete changes to the rest of the fields as necessary. Refer to Figure 6-19. In the right-hand column of this example, Analog Input has been copied to the other Analog Inputs location, and the data values have been altered to reflect second AI data. **Save** the display, and then press **Cancel**.

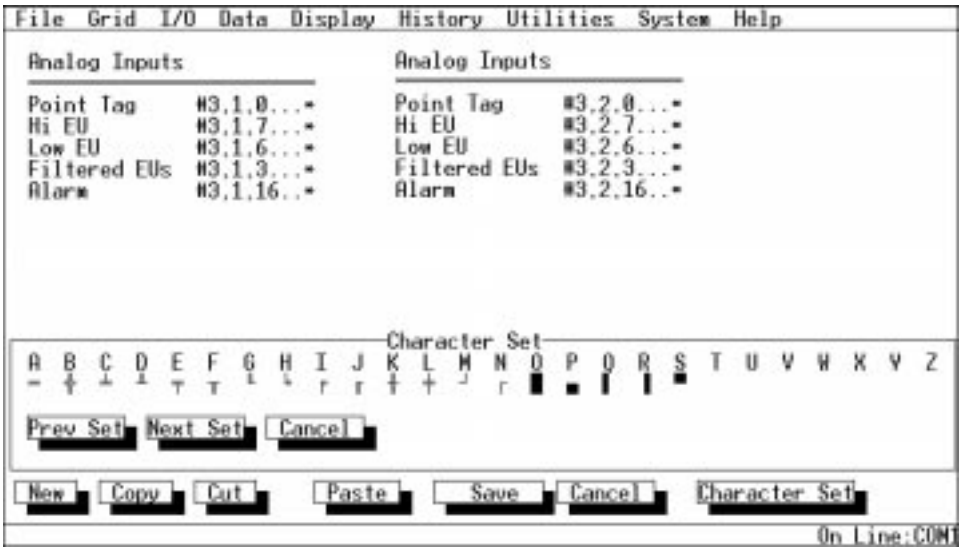

Figure 6-19. Custom Display

6.2.3 Display On Disk

Select Display from the menu bar and then choose Display on Disk. The Display on Disk option reads a display from a previously saved `.DSP` file, translates the data fields, and updates the data.

When you select Display on Disk, you are presented with a display listing the names of all the files that have the `.DSP` extension and are located in the GRIDLINK default drive and directory. Refer to Figure 6-20. Change the Drive and Directory as needed to locate the desired display file.

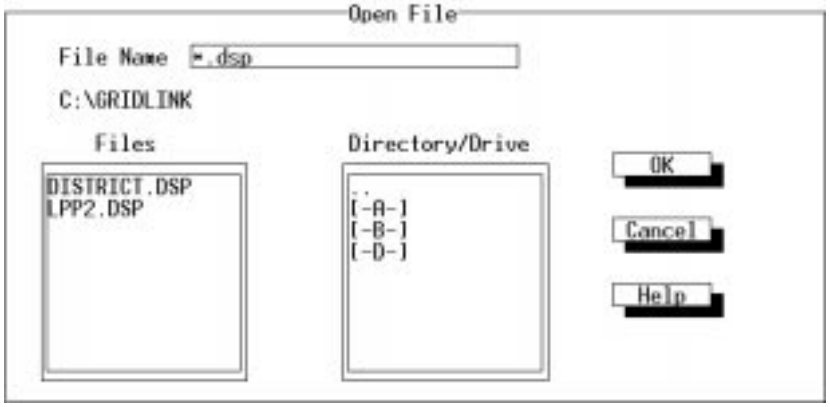

Figure 6-20. Open Display Dialog

Upon selecting a display file, the display appears on screen with any data fields showing the current values. Refer to Figure 6-21.

Figure 6-21. Display from Disk

The following pushbuttons are available at the bottom of the screen:

Update — Use this pushbutton to cause a one-time update of all "live" data fields on the display.

Auto Scan / Stop Scan — Use the **Auto Scan** pushbutton to periodically (approximately once a second) update all "live" data fields on the display. Use the **Stop Scan** pushbutton to stop the automatic updating and toggle the pushbutton label back to **Auto Scan**.

Edit Display — Use this pushbutton to place the display into the edit mode. The pushbuttons available at the bottom of the screen change to **New**, **Copy**, **Cut**, **Paste**, **Save**, **Cancel**, and **Character Set**. Refer to section 6.2.1 for an explanation of how to use these pushbuttons.

Cancel — Closes the currently selected display screen, and returns you to the Display menu.

Save Values — If the value in a live data field was manually changed, this pushbutton causes the entered value to be sent to corresponding parameter in the GridBoss. Whether or not the parameter actually accepts the new value depends on the whether the parameter can be written to, as well as other factors.

6.3 MONITOR

Select Display from the menu bar and then choose Monitor. Use Monitor to view all installed and active I/O points and PID Loops that provide information about the GridBoss and its operating environment. With the appropriate devices installed, the Monitor feature includes the following:

- Monitor Discrete Input
- Monitor Discrete Output
- Monitor Analog Input
- Monitor Analog Output
- Monitor Pulse Input
- Control Loop

Once you have selected one of the monitor functions, a screen appears that shows the requested point information such as field I/O values or calculated flow values. These on-screen values are automatically updated by the GRIDLINK software. In each screen, if there are additional points to view, you can use the **Next Set** and **Prev Set** pushbuttons.

6.3.1 Monitor Discrete Input

The monitor display for Discrete Inputs shows up to five Discrete Input points on one display. If the GridBoss you are monitoring has more than five Discrete Input points including diagnostic inputs, use **Next Set** and **Prev Set** to view points. Refer to Figure 6-22.

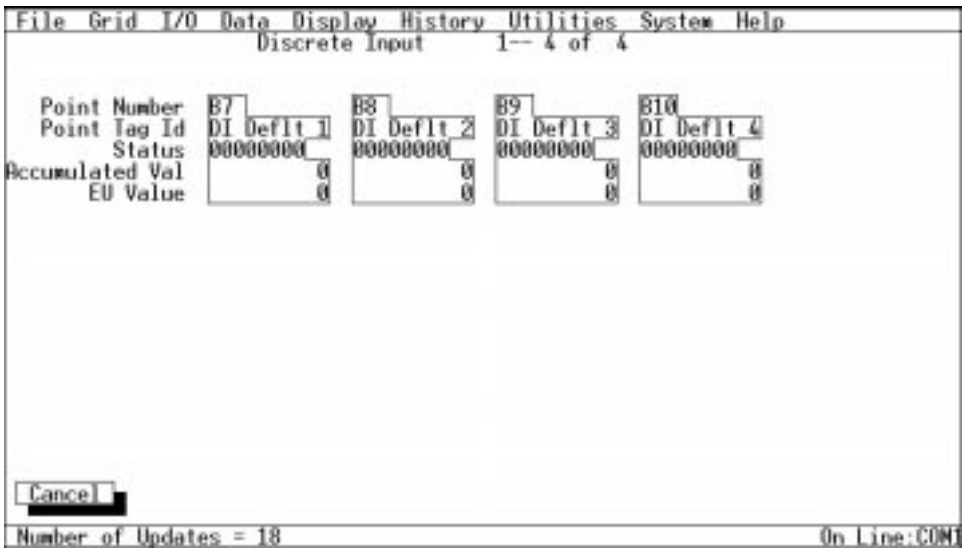

Figure 6-22. Monitor Discrete Inputs

6.3.2 Monitor Discrete Output

The monitor display for Discrete Outputs shows up to five Discrete Output points on one display. If the GridBoss you are monitoring has more than five Discrete Output points, you can view additional points by using **Next Set** and **Prev Set** buttons. Refer to Figure 6-23.

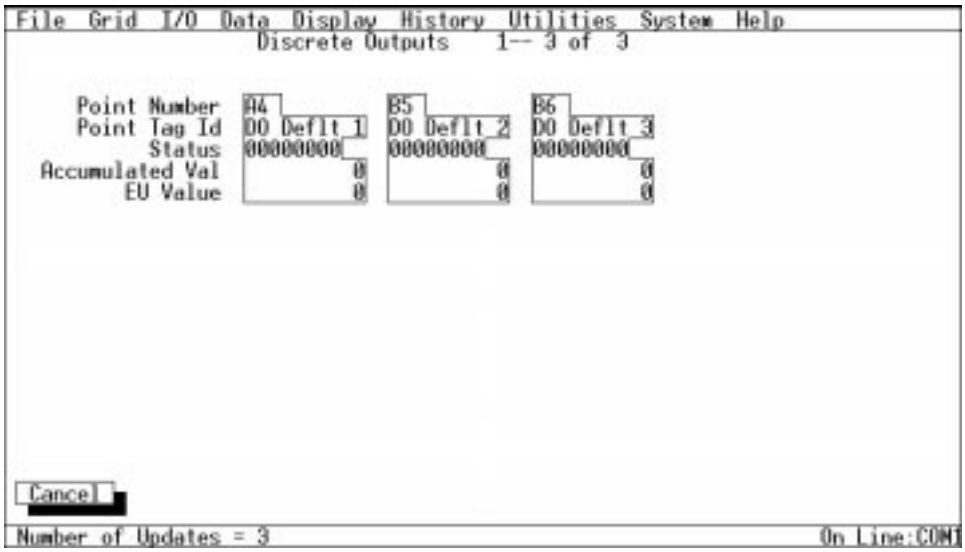

Figure 6-23. Monitor Discrete Outputs

6.3.3 Monitor Analog Input

The monitor display for Analog Inputs shows up to five Analog Input points at a time. If the GridBoss you are monitoring has more than five Analog Input points including diagnostic inputs, use **Next Set** and **Prev Set** to view points. Refer to Figure 6-24.

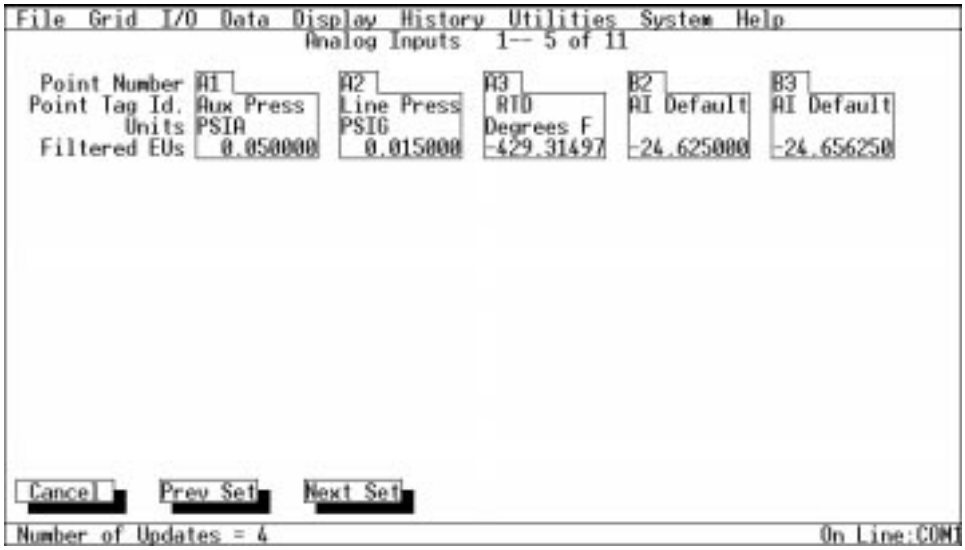
File Grid I/O Data Display History Utilities System Help
Analog Inputs 1-- 5 of 11
Point Number A1 A2 A3 B2 B3
Point Tag Id. Aux Press Line Press RTD AI Default AI Default
Units PSIA PSIG Degrees F
Filtered EUs 0.050000 0.015000 -429.31497 -24.625000 -24.656250
Cancel
Prev Set
Next Set
Number of Updates = 4
On Line:CONT

Figure 6-24. Monitor Analog Input

6.3.4 Monitor Analog Output

The monitor display for Analog Outputs shows up to five Analog Output points at a time. If the GridBoss you are monitoring has more than five Analog Output points, you can view the next five points by using **Next Set** and **Prev Set** buttons. Refer to Figure 6-25.

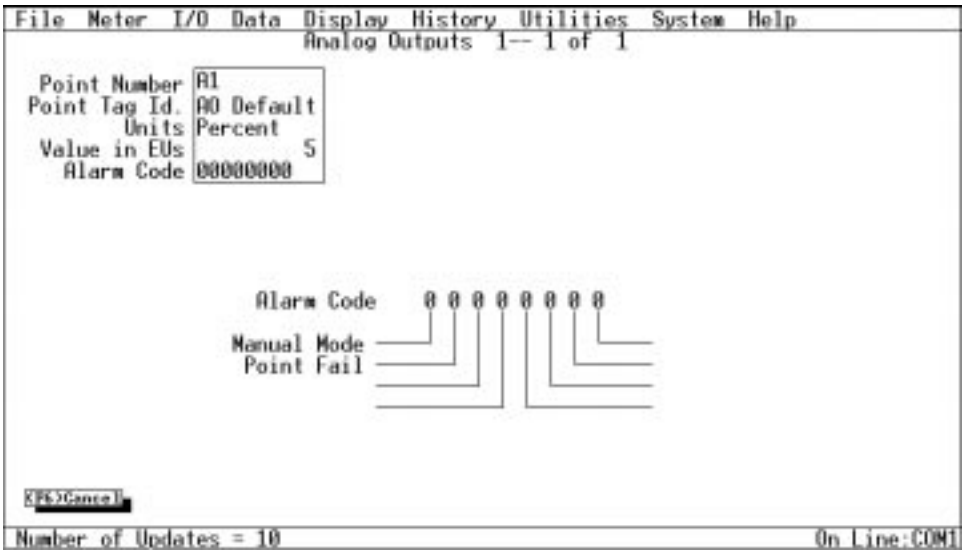
File Meter I/O Data Display History Utilities System Help
Analog Outputs 1-- 1 of 1
Point Number A1
Point Tag Id. AO Default
Units Percent
Value in EUs 5
Alarm Code 00000000
Alarm Code 0 0 0 0 0 0 0 0
Manual Mode
Point Fail
Number of Updates = 10
On Line:COM1

Figure 6-25. Monitor Analog Outputs

Alarm Code — An 8-bit field, for informational purposes only. If a bit is set to "1", the alarm is active. If a bit is set to "0" the alarm is cleared.

6.3.5 Monitor Pulse Input

The monitor display for Pulse Inputs shows up to five Pulse Input points at a time. If the GridBoss you are monitoring has more than five Pulse Inputs points, you can view the next five points by using **Next Set** and **Prev Set** buttons. Refer to Figure 6-26.

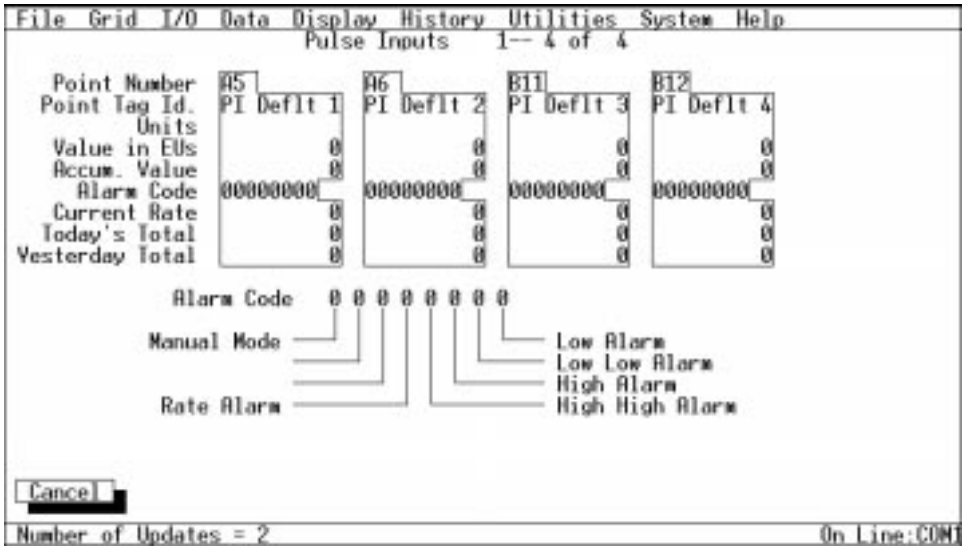

Figure 6-26. Monitor Pulse Input

Alarm Code — An 8-bit field, for informational purposes only. If a bit is set to "1", the alarm is active. If a bit is set to "0" the alarm is cleared.

6.3.6 Control Loop

The monitor display for Control Loops shows a different display depending on the type of GridBoss that you are viewing. Refer to Figure 6-27 and Figure 6-28.

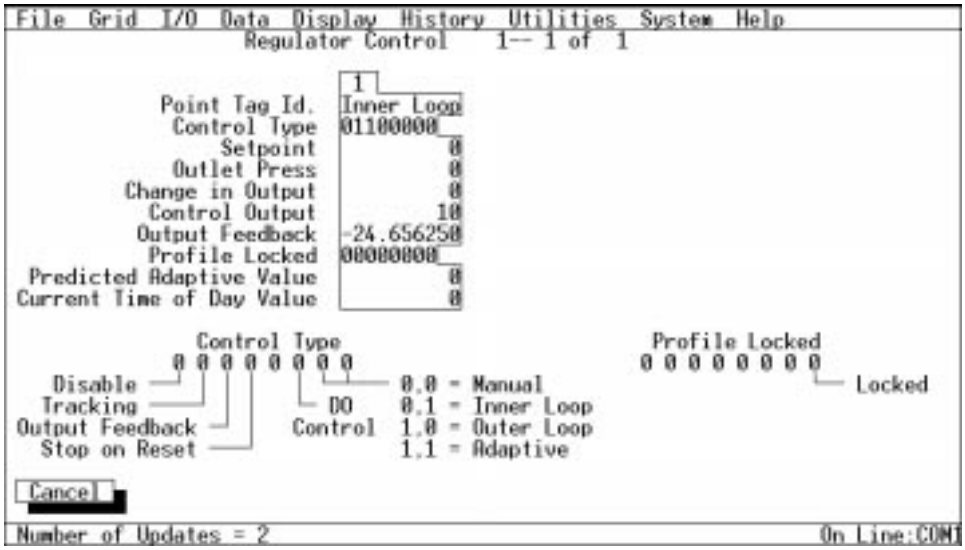

Figure 6-27. District Regulator Outer Control Loop Monitor

Control Type — An 8-bit field, for informational purposes only. If a bit is set to "1", the Control Type is active. If a bit is set to "0" the Control Type is not active. Note that the actual Control Type (Manual, Inner Loop, Outer Loop, and Adaptive Mode) use two bits to display the current Mode of the Control Type.

Profile Locked — An 8-bit field, for informational purposes only. If the last bit (far right) is set to "1", the time-of-day profile is not locked and can actively alter the time-of-day load profile. If the last bit (far right) is set to "0", the time-of-day profile is locked and can NOT actively alter the time-of-day load profile.

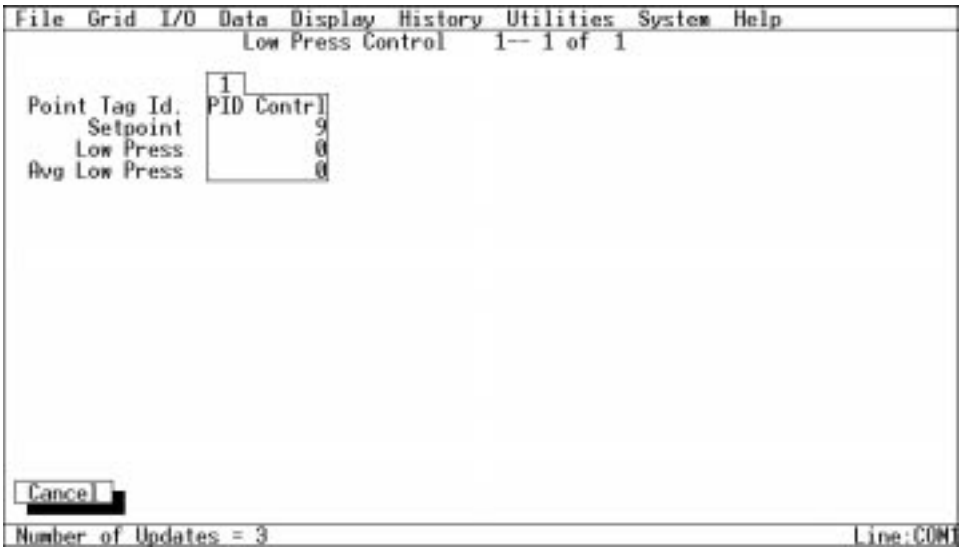

Figure 6-28. Low Pressure Point Inner Control Loop Monitor

SECTION 7 — THE HISTORY MENU

7.1 SCOPE

This section describes how to configure the GridBoss history and view the various logs.

This section contains the following information:

Information	Section	Page Number
History Setup	7.2	7-1
Min/Max History	7.3	7-7
History Point Headers	7.3.1	7-7
Displaying History Points	7.3.2	7-8
Minute History	7.4	7-9
15-Minute	7.5	7-10
Day History	7.6	7-11
Events History	7.7	7-13
Alarms History	7.8	7-15

7.2 HISTORY SETUP

Select History and choose Setup. A screen appears as shown in Figure 7-1.

The History Setup option allows data values and calculated variables stored in the current value database to be copied and stored for up to a month in the historical database. The historical database can be configured to log only the values that need to be logged. The values are logged in the standard (minute-hourly-daily) time base of the GridBoss unless FST control is used. By using the FST Editor utility, the period in which the data is logged can be placed under program control.

NOTE

The time stamp used for standard logging of historical values reflects the time at the end of the period, not at the beginning. For example, data collected from 8:00 to 9:00 is time-stamped 9:00.

Four types of historical databases are maintained by the GridBoss controller:

- Min/Max Database
- Minute Database
- 15-Minute Database
- Daily Database

The Min/Max Database is for viewing only and cannot be saved to a disk file.

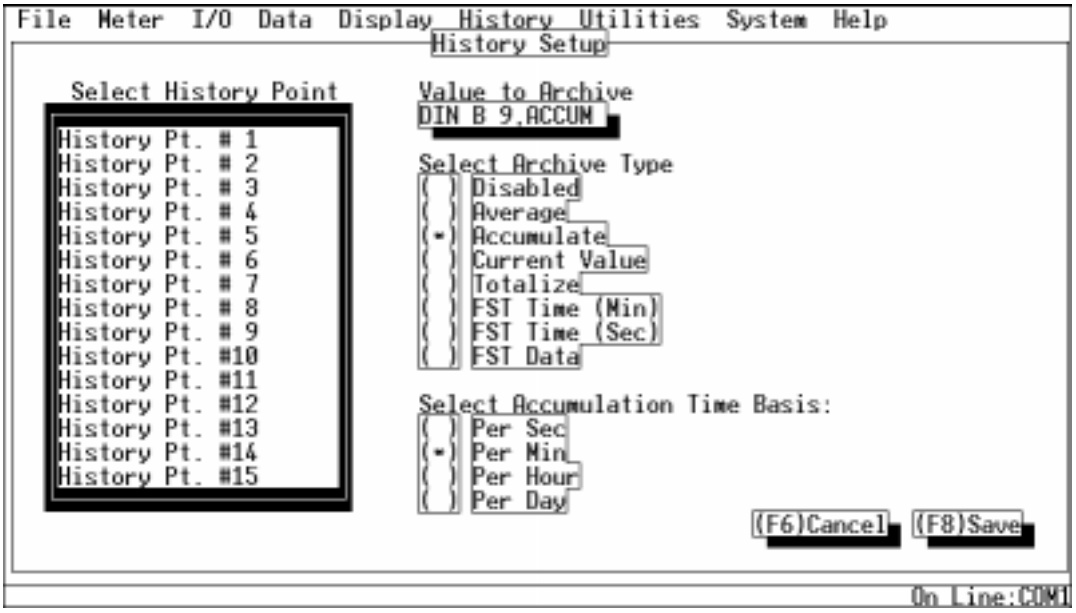

Figure 7-1. History Setup

A total of fifteen history points may be accessed in the GridBoss.

At the **District Regulator GridBoss**, the first nine history points are pre-configured. Refer to Table 7-1.

CAUTION

Do not alter the pre-configured default history points.

Table 7-1. DR Default History Points

History Point	Definition	Point Type	Type of Archiving
1	Inner Loop Ambient Temperature Value	APC #1, TMPVAL	Average
2	Differential Pressure	AIN A 1, EU	Average
3	Inner Loop Regulator Input Pressure	DRC #1, PRSVAL	Average
4	Inner Loop Regulator Output Pressure	DRC #1, OUTVAL	Average
5	Inner Loop Regulator Output Pressure Monitor	DRC #1, MONVAL	Average
6	Inner Loop Coefficient of Temperature	APC #1, TCOEFF	Current Value
7	Inner Loop Adaptive Error	APC #1, AERROR	Current Value
8	PID Control Output Value Setpoint	DRC #1, SETPT	Current Value
9	Battery Voltage	AIN E 1, EU	Average

At the **Low Pressure Point GridBoss**, the first seven history points are pre-configured. Refer to Table 7-2.

CAUTION

Do not alter the pre-configured default history points.

Table 7-2. LPP Default History Points

History Point	Definition	Point Type	Type of Archiving
1	Input Pressure	LPC #1, LPVAL	Average
2	Number of Calls from District Regulator 1	DR #1, Calls	Current Value
3	Number of Calls from District Regulator 2	DR #2, Calls	Current Value
4	Number of Calls from District Regulator 3	DR #3, Calls	Current Value
5	Number of Calls from District Regulator 4	DR #4, Calls	Current Value
6	Number of Calls from District Regulator 5	DR #5, Calls	Current Value
7	Battery Voltage	AIN E 1, EU	Average

History points for the GridBoss are configured using GRIDLINK and are selected in the History Setup screen located in the History menu's Setup option. All history points in a GridBoss may be configured as desired. All history points are configured using Point Type, Logical Number, and Parameter Number (TLP).

Select History Point — In the list box, select (highlight) the history point you desire to configure. The parameter currently configured (if any) for this history point appears in the Value to Archive pushbutton. Note that for the GridBoss, the first eight history points are pre-configured (as described above) and cannot be changed by the user; begin selecting history points with History Pt. #9.

Value to Archive — Activate the pushbutton under the **Value to Archive** label to specify a Point Type and Parameter to be archived. Refer to Figure 7-2.

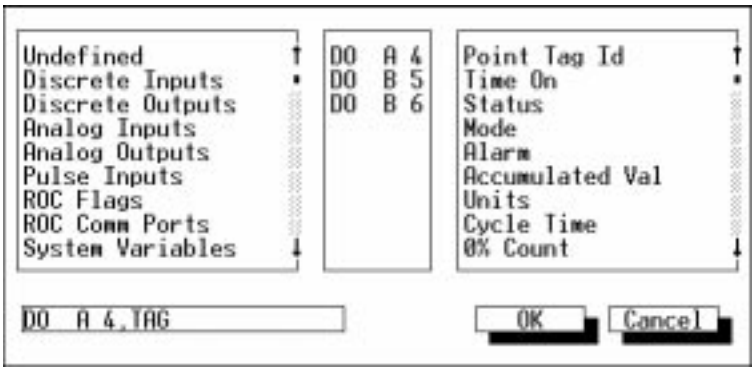

Figure 7-2. Archived Value

First, determine the Point Type to archive by highlighting it in the left-most scrollable list. If you want to keep this history point from logging values, select **Undefined** as the point type.

Next, in the middle scrollable list, select the exact Point Type Location, Parameter, or the Logical Number. For example, in an Analog Input point type you might select AIN A 2. Refer to Table 7-3.

NOTE

Interpret the information on the Value to Archive pushbutton (for example, AIN A 3, EU) in the following manner. The first part is a three-character mnemonic (in this example, "AIN" means Analog Input) that indicates the Point Type. The second part (such as "A 3") indicates the Point Number. The third part is a mnemonic indicating the selected Parameter (such as EU for the Filtered Engineering Units Parameter).

CAUTION

Do not alter the pre-configured default history points.

Table 7-3. GridBoss Point Types

Name	Point Type Description	Name	Point Type Description
ACCUM	Accumulated Value	MIN	Minutes
AGAIN	Adaptive Gain	MONTH	Month
AERROR	Adaptive Error	MONVAL	Output Monitor Value
ALARM	Alarm Code	MPULOD	Microprocessor Unit Loading
AIN	Analog Input		
AO	Analog Output	OFFCNT	Off Counter
APC	Adaptive Parameters	ON CNT	On Counter
AVGLP	Average Low Pressure	ONCTR	On Counter
		OUTVAL	Output Value
CALLS	Number of Completed Calls		
CENTRY	Century	PCT	Radio Power Control
CHGOUT	Change in Output	PIN	Pulse Input
CHGSP	Change in Inner Setpoint	PREDCT	Predicted Adaptive
CHINSP	Change in Setpoint	PRSVAL	Output Pressure Value
CLK	Real Time Clock		
COM	GridBoss Communication Port	R1 – R10	FST Registers
CURRAW	Raw A/D Input or Raw D/A Output	RATE	Current Rate
CURRNT	Current TOD Value	REGISTER	Register
DATA1 – DATA20	Soft Point Data	SEC	Seconds
DAY	Day	SCAN	Actual Scan Time / Actual Loop Period
DIN	Discrete Input	SETPT	Setpoint
DO	Discrete Output	SPDBND	Setpoint Deadband
DR	District Regulator	SPT	Soft Point
DRC	Regulator Control	STATUS	Status or Loop Status
		SYS	System Variables
EU	Engineering Unit Value or Filtered EU		
		TAG	Tag
FLG	GridBoss System Flags	TCOEFF	Coefficient of Temperature
FST	Function Sequence Table Registers	TDYRAW	Pulses Today
		TDYTOT	Today's Total
HOUR	Hours	TMPVAL	Temperature Value
INTFLG	Integer Flag	VRXCTR	Valid Receive Counter
LPC	Low Pressure Control	YDYTOT	Yesterday's Total
LPP	DR Communications to LPP	YEAR	Year
LPPVAL	Average LPP Value		
LPVAL	Low Pressure Value		

Finally, in the right-most scrollable list, choose the specific parameter to log.

Select Archive Type — Choose one of the options listed to specify the exact archive type of the history point. The archive type affects how the logged value is calculated; included are some special purpose types for FST control (refer to the FST User Manual, especially the WDB and WTM commands).

Disabled — Point not configured.

Average — Minute values are averaged to compute the hourly value. The inputs (such as Differential Pressure) allow you to select among four types of averaging for calculating flow quantities or for providing values. See the Select Average Type parameter below.

Accumulate — Accumulate is not used in the GridBoss System.

Current Value — Current sampled value is used for the hourly value.

Totalize — The difference between the current value and last hour's current value is used for point values polled or received as accumulated values. This accumulation technique is used to acquire accurate accumulated counts from an input for a specified time period. Totalization assumes that the value being archived is zeroed out by something else at Contract Hour and that no rollover of the value occurs. Totalization occurs at the Minute Historical Log and is summed up for the 15-Minute and Daily Historical Logs. A minute after Contract Hour, the current value is archived. All other minutes will be the difference between the current value and the previous minute's archived value.

FST Time (Min) — This allows the FST to archive the time it placed a value in another history point. The Function Sequence Table controlled time stamp is stored as Day/Month, Hour: Minute.

FST Time (Sec) — This allows the FST to archive the time it placed a value in another history point. The Function Sequence Table controlled time stamp is stored as Day, Hour: Minute: Second.

FST Data — This allows the FST to archive a value to a historical archive. Function Sequence Table controls archiving of data to a history point based on criteria you establish. The FST must be written to write to the appropriate index in the historical archive.

Select Accumulation Time Basis — When the Select Archive Type parameter is set to Accumulate, this list appears at the bottom of the screen. Choose one of the following options to determine how the accumulated values are computed: per second, per minute, per hour, or per day.

7.3 MIN/MAX HISTORY

Select History from the menu bar and then choose Min/Max. The Min/Max database option displays the minimum and maximum values for history points logged in the GridBoss over a 24-hour period. The minimum and maximum values are determined and stored at the end of each day, based on the Contract Hour. Refer to Figure 7-3.

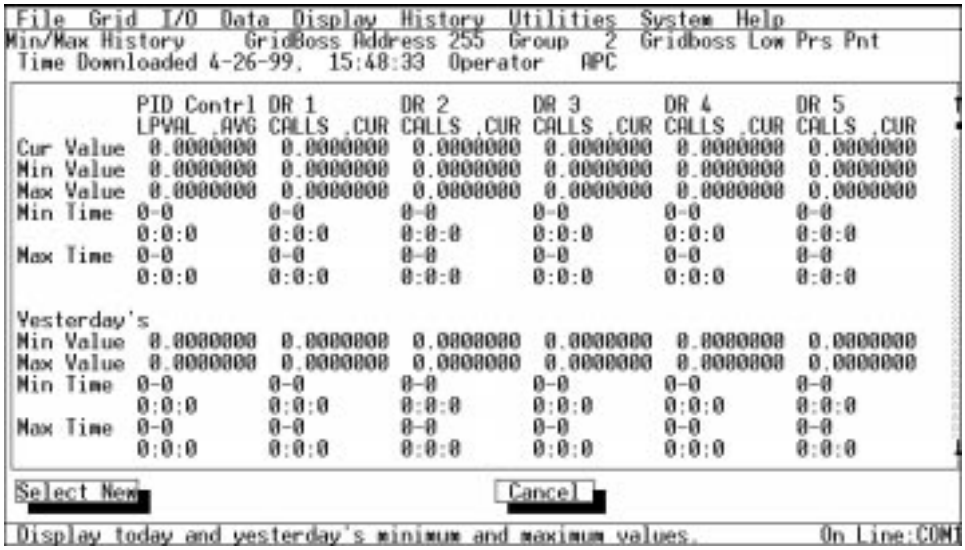
File Grid I/O Data Display History Utilities System Help
Min/Max History GridBoss Address 255 Group 2 Gridboss Low Prs Pnt
Time Downloaded 4-26-99, 15:48:33 Operator APC
PID Contrl LPVAL ,AVG
DR 1 CALLS ,CUR
DR 2 CALLS ,CUR
DR 3 CALLS ,CUR
DR 4 CALLS ,CUR
DR 5 CALLS ,CUR
Cur Value 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
Min Value 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
Max Value 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
Min Time 0-0 0:0:0
Max Time 0-0 0:0:0
Yesterday's
Min Value 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
Max Value 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
Min Time 0-0 0:0:0
Max Time 0-0 0:0:0
Select New
Cancel
Display today and yesterday's minimum and maximum values.
On Line:CONT

Figure 7-3. Min/Max History

7.3.1 History Point Headers

The top of each History table, Min/Max, Minute, Hour, Day, Alarm, and Event, displays a header identifying the GridBoss from which the information is being acquired.

Table Name — The unidentified table field displays which table you are viewing: Min/Max History, Minute History, Hourly History, Daily History, Alarm Log, or Event Log.

GridBoss Address — The GridBoss Address of the GridBoss being polled. The GridBoss Address is setup in the System Information screen.

GridBoss Group — The GridBoss Group of the GridBoss being polled. The GridBoss Group is setup in the System Information screen.

Type — The Type of GridBoss – District Regulator (DR) or Low Pressure Point (LPP).

Time Downloaded — The date and time the history file was created.

Operator — The Operator currently logged on to GRIDLINK. The Operator ID is setup in the GRIDLINK Security screen.

Log # — The first number displays what log in the series you are viewing. The second number displays how many logs are available in the series. The last number, if present, displays how many total logs are in the file.

7.3.2 Displaying History Points

Use the **Select New** pushbutton to display history points. Note that some history points with certain Archive Types (such as Accumulate) do not have useful Min/Max values. Refer to Figure 7-4.

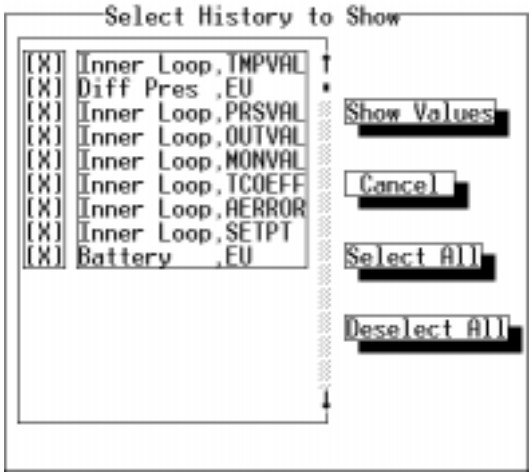

Figure 7-4. Select New – DR Default Example

By default, all history points are selected. Click the check box to deselect any points you do not want to display. To reselect a point, just click on its check box again. The first six history points that remain selected display on the History screen.

7.4 MINUTE HISTORY

Select History from the menu bar and then choose Minute. The Minute History database option displays the values for history points (other than FST controlled) logged in the GridBoss for the last 60 minutes in one-minute increments from the current minute.

The District Regulator samples ambient temperature, regulator inlet pressure, regulator outlet pressure, output signal to the Kixcel, Kixcel position, and battery voltage once a second. The DR then stores one hour of minute averages to the Minute Historical Log.

The Low Pressure Point samples the low pressure point value and battery voltage once a second. The LPP then stores one hour of minute averages to the Minute Historical Log.

The values are always displayed with the most recent value first. Refer to Figure 7-5.

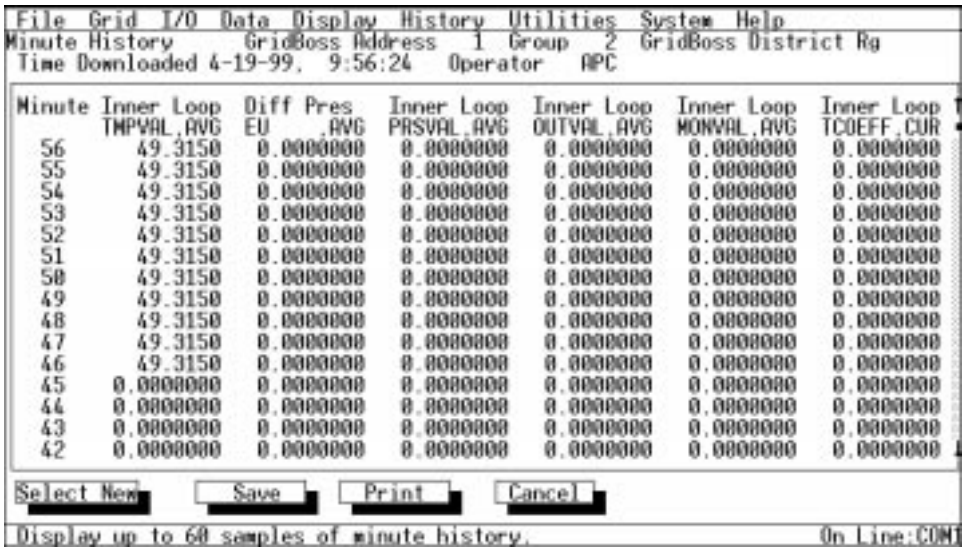

Figure 7-5. Minute History

You can use the pushbuttons at the bottom of the screen to view other history points, save the log, or print it. Use the **Select New** pushbutton to display history points other than the first six.

Use the **Save** pushbutton to store the entire log in a disk file that you specify. Use the `.mdb` extension when naming the log file. This file can be viewed or printed later using the Open option in the File menu.

Use the **Print** pushbutton to immediately send the entire log to a connected, on-line printer. The log prints out up to five history points to a page.

7.5 15-MINUTE

Select History from the menu bar and then choose 15-Minute. The 15-Minute History (sometimes called **historical** or **periodical**) database option displays the values for history points (other than FST controlled) logged in the GridBoss at 15-minute intervals for the past 35 days. The 15-Minute log contains up to 840 entries and is archived every 15 minutes at the latest. The values always display with the most recent value first. The time stamp for periodic logging consists of the month, day, hour, and minute. The exception is for FST Second logging, in which the time stamp consists of the day, hour, minute, and second.

The District Regulator parameters include: ambient temperature, regulator inlet pressure, regulator outlet pressure, output signal to the Kixcel, Kixcel position, and battery voltage once a second.

The LPP parameters include: the low pressure point value and battery voltage once a second. The LPP stores 8 days of 15 minute averages of the low pressure point value and battery voltage.

The values always display with the most recent value first. Refer to Figure 7-6.

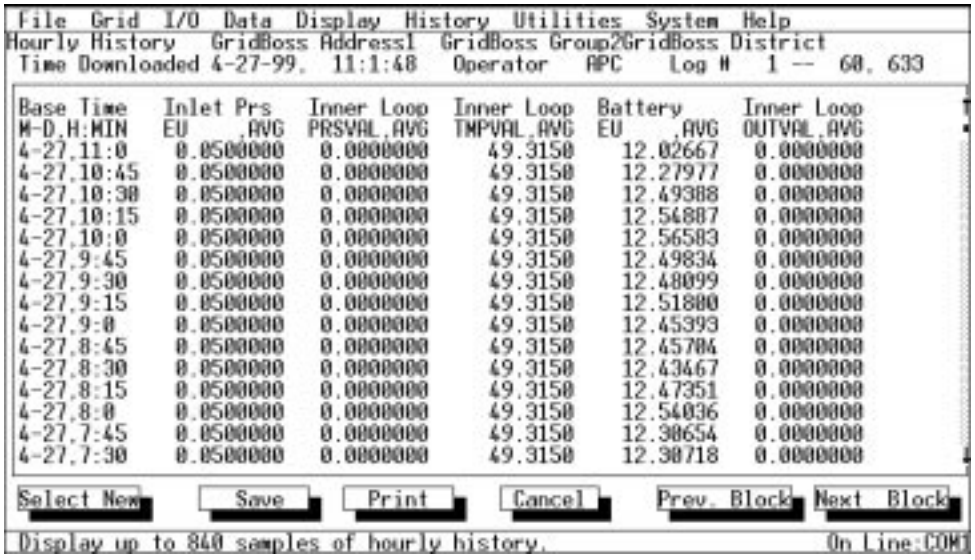

Figure 7-6. 15-Minute History

You can use the pushbuttons at the bottom of the screen to view other history points, to save the log, to print the log, or to view other days of 15-Minute data. Use the **Select New** pushbutton to display history points other than the first six.

Use the **Save** pushbutton to store the log (all selected history points) in a disk file that you specify. Use the `.pdb` extension when saving the 15-Minute History log. You can specify the number of entries to be saved, up to the maximum of 840. This file can be viewed or printed later using the Open option in the File menu.

Use the **Print** pushbutton to immediately send the entire log to a connected, on-line printer. The log prints out up to six history points to a page.

The **Next Block** and **Prev. Block** pushbuttons are used to move between blocks of 15-Minute logs. Each block contains up to 60 15-Minute entries. To look at the entries past the first 15 entries in the currently selected block, use the scroll bar on the side of the list. The scroll bar only works for the currently selected block; you cannot scroll between blocks.

7.6 DAY HISTORY

Select History from the menu bar and then choose Day. The Day History (Daily History) database option displays the values for history points (other than FST controlled) logged in the GridBoss on a daily basis for the past 35 entries. The daily log entry is created at the end of the Contract Hour, except when Force End of Day (see System Information screen) is used. The time stamp for Daily Historical logging consists of the month, day, hour, and minute. The exception is for FST Second logging, in which the time stamp consists of the day, hour, minute, and second. Each history point has daily historical log entries unless the history point is configured for FST-controlled logging.

The GridBoss has a total of 35 Daily Historical Logs for the LPP and DR history point parameters. The GridBoss logs 35 days of daily history for the LPP and DR parameters and 2 days of daily minimum and maximum values of their parameters.

The District Regulator parameters include: ambient temperature, regulator inlet pressure, regulator outlet pressure, output signal to the Kixcel, Kixcel position, and battery voltage once a second.

The LPP parameters include: the low pressure point value and battery voltage once a second.

The values are always displayed with the most recent value first. Refer to Figure 7-7.

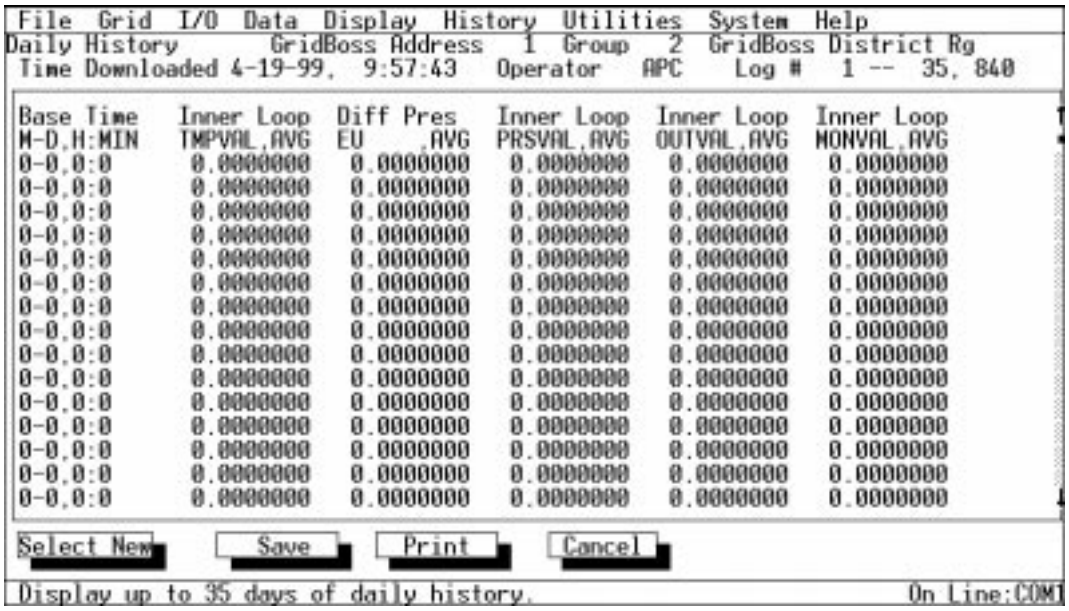
File Grid I/O Data Display History Utilities System Help
Daily History GridBoss Address 1 Group 2 GridBoss District Rg
Time Downloaded 4-19-99, 9:57:43 Operator APC Log # 1 -- 35, 840
Base Time M-D,H:MIN
Inner Loop TMPVAL,AVG
Diff Pres EU ,AVG
Inner Loop PRSVAL,AVG
Inner Loop OUTVAL,AVG
Inner Loop MONVAL,AVG
0-0,0:0 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
Select New
Save
Print
Cancel
Display up to 35 days of daily history.
On Line:COM1

Figure 7-7. Day History

NOTE

The time stamp in the GridBoss reflects the time at the end of the period — not at the beginning. Data collected from 9/20 to 9/21 is time-stamped 9-21.

You can use the pushbuttons at the bottom of the screen to view other history points, to save the log, or to print it. Use the **Select New** pushbutton to display history points other than the first six.

Use the **Save** pushbutton to store the entire log in a disk file that you specify. Use the `.day` extension when saving the Daily History log file. This file can be viewed or printed later using the Open option in the File menu.

Use the **Print** pushbutton to immediately send the entire log to a connected, on-line printer. The log prints out up to six history points to a page.

7.7 EVENTS HISTORY

Select History from the menu bar and then choose Events. Refer to Figure 7-8. The Events History log option displays the event database. The Event Log records changes to the configuration of the GridBoss. The event function records the last 240 occurrences of parameter changes, power on/off cycles, system initialization, program downloads, and FST-directed events. Refer to Section 7.8 for viewing alarm "events."

You can use pushbuttons to change the time order of the log, save it, print it, or view. Use the **Invert** pushbutton to change the order of the log (default is newest to oldest) and return to the first block of the log in its new order. Use the **Save** pushbutton to store the entire event log in a disk file that you specify. Use the `.evt` extension when saving the Events History log file. This file can be viewed or printed later using the Open option in the File menu. Use the **Print** pushbutton to immediately send the entire log to a connected, on-line printer. The log prints out approximately 50 entries to a page, for a total of five pages.

The **Next Block** and **Prev. Block** pushbuttons are used to move between blocks of events. Each block may contain up to 30 event lines. If there are more than 15 event lines in the currently selected block, you can use the scroll bar on the side of the list to view the rest of the events in the block. The scroll bar only works for the currently selected block of events; you cannot scroll between blocks of events.

The Event Log has information fields that describe the point type, parameter number, time and date the parameter changed value, the type of event, description of the event, logical/point number, the operator log-on identification, the old value, the new value, or a 14-character detailed string.

The Event Log is only cleared when **Restore config and clear alarm/event logs** is selected in the Cold Start Options dialog and a Cold Start is performed. No event is logged if there is no change to the parameter value. There are several types of events possible other than a parameter for a point type being changed. These events are listed after Figure 7-8.

Refer to Figure 7-8 for a sample display.

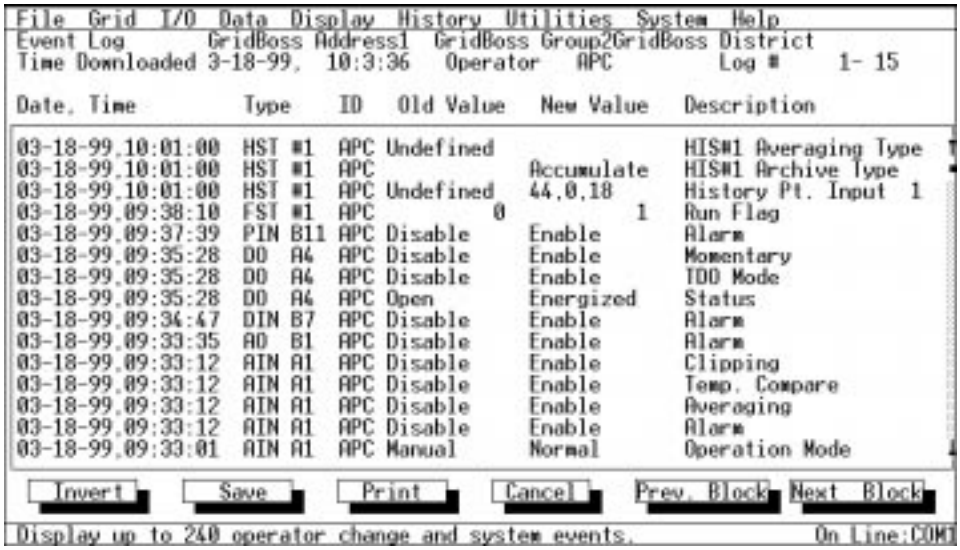
File Grid I/O Data Display History Utilities System Help
Event Log GridBoss Address1 GridBoss Group2GridBoss District
Time Downloaded 3-18-99, 10:3:36 Operator APC Log # 1- 15
Date, Time Type ID Old Value New Value Description
03-18-99,10:01:00 HST #1 APC Undefined HIS#1 Averaging Type
03-18-99,10:01:00 HST #1 APC Accumulate HIS#1 Archive Type
03-18-99,10:01:00 HST #1 APC Undefined 44,0,18 History Pt. Input 1
03-18-99,09:38:10 FST #1 APC 0 1 Run Flag
03-18-99,09:37:39 PIN B11 APC Disable Enable Alarm
03-18-99,09:35:28 DO A4 APC Disable Enable Momentary
03-18-99,09:35:28 DO A4 APC Disable Enable TDO Mode
03-18-99,09:35:28 DO A4 APC Open Energized Status
03-18-99,09:34:47 DIN B7 APC Disable Enable Alarm
03-18-99,09:33:35 AO B1 APC Disable Enable Alarm
03-18-99,09:33:12 AIN A1 APC Disable Enable Clipping
03-18-99,09:33:12 AIN A1 APC Disable Enable Temp. Compare
03-18-99,09:33:12 AIN A1 APC Disable Enable Averaging
03-18-99,09:33:12 AIN A1 APC Disable Enable Alarm
03-18-99,09:33:01 AIN A1 APC Manual Normal Operation Mode
Invert
Save
Print
Cancel
Prev. Block
Next Block
Display up to 240 operator change and system events.
On Line:COM1

Figure 7-8. Event Log History

Event Log exceptions include:

- LPP communicating the change in Inner Loop Setpoint and Average Pressure for the minute
- Disk Configuration
- AI Calibration
- Initialization Sequence
- All Power Removed
- Initialized from Defaults
- Diagnostic
- Program Flash Memory
- New Clock
- FST
- Test Message in Event Log

7.8 ALARMS HISTORY

Select History from the menu bar and then choose Alarms. The Alarms History log option displays the Alarm Log. The Alarm Log is used for recording when exceptional conditions occur from field inputs and calculations. The Alarm Log contains the last 240 occurrences of alarms. Refer to Section 7.7 for viewing other types of events.

You can use pushbuttons to change the time order of the log, to save it, to print it, or to view it. Use the **Invert** pushbutton to change the order of the log (default is newest to oldest) and return to the first block of the log in its new order. Use the **Save** pushbutton to store the entire alarm log in a disk file that you specify. Use the `.alm` extension when saving the Alarms History log file. This file can be viewed or printed later using the Open option in the File menu. Use the **Print** pushbutton to immediately send the entire log to a connected, on-line printer. The log prints out approximately 50 entries to a page, for a total of five pages.

The **Next Block** and **Prev. Block** pushbuttons are used to move between blocks of alarm entries. Each block contains up to 15 alarm entries.

Information about each alarm includes the date and time of the alarm, the tag identifier, whether the alarm is set or cleared, the actual value of the alarmed point, and the alarm description. Refer to Figure 7-9 for a sample display.

File Grid I/O Data Display History Utilities System Help
Alarm Log GridBoss Address1 GridBoss Group2GridBoss District
Time Downloaded 3-18-99, 10:3:59 Operator APC Log # 1- 15
Date, Time Tag Set, Clear Value Description
03-18-99,09:37:40 PI Deflt 1 Alarm Set 0.0000000 Lo Lo Alarm
03-18-99,09:37:40 PI Deflt 1 Alarm Set 0.0000000 Low Alarm
03-18-99,09:33:13 Diff Pres Alarm Set 0.0000000 High Alarm
03-18-99,09:33:13 Diff Pres Alarm Set 0.0000000 Low Alarm
03-18-99,09:27:42 Inner Loop Alarm Set 10.00000 Output Failure
-22--70--93,-72:-113:25Undefined -65, -86
-107-75-105,117:23:-107Undefined -37, 117
-5--126--98,-2:-54:-14-«)J?* OVERFLOW Output Failure
-13-61-119,117:87:-99 RBX Alm Set OVERFLOW Invalid Alarm
117-46--119,83:-8:-88Undefined 15, 107
-82-56--8,107:-86:-86Undefined -110, 62
-33--33-125,-41:-43:95Undefined -33, -41
-2--53--16,88:-86:-18Undefined 42, -70
-65-125-93,95:-123:-43Undefined -68, 95
-98--67-80,59:-65:24Undefined -71, 107
Invert
Save
Print
Cancel
Prev. Block
Next Block
Display up to 240 system generated alarms.
On Line:CONT

Figure 7-9. Alarm Log History

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SECTION 8 — THE UTILITIES MENU

8.1 SCOPE

This section describes the GRIDLINK Utilities menu used in establishing security and creating macros. The Utilities menu also contains options for viewing the GridBoss memory and calibration values.

This section contains the following information:

Information	Section	Page Number
Security	8.2	8-1
GRIDLINK Operator	8.2.1	8-2
GridBoss Logon	8.2.2	8-4
Macros	8.3	8-5
Record Macro	8.3.1	8-5
Play Macro	8.3.2	8-6
Stop Recording	8.3.3	8-6
Example Macro	8.3.4	8-7
GridBoss Memory	8.4	8-8
Calibration Values	8.5	8-9

8.2 SECURITY

If you are logged on at the highest level (6), when you select Utilities from the menu bar and choose Security, the options to choose from are:

- GRIDLINK Operator
- GridBoss Logon

Select GRIDLINK Operator to edit the log-ons of all users of the GRIDLINK software on this PC, and the edit other options to control who is allowed access to a connected GridBoss.

Initially, you may access GRIDLINK and the GridBoss using the default Operator ID **APC** and default password **1234**.

CAUTION

After you initially access GRIDLINK and establish security parameters, delete the default Operator ID APC and default password 1234 to prevent unauthorized users from accessing and changing parameters.

8.2.1 GRIDLINK Operator

Select the GRIDLINK Operator or GRIDLINK Security option under Security in the Utilities menu to edit the log-ons of all users of the GRIDLINK software on that PC.

The GRIDLINK Security screen that appears allows you to specify the Operator ID, Password, and Level of up to 21 different users. Refer to Figure 8-1.

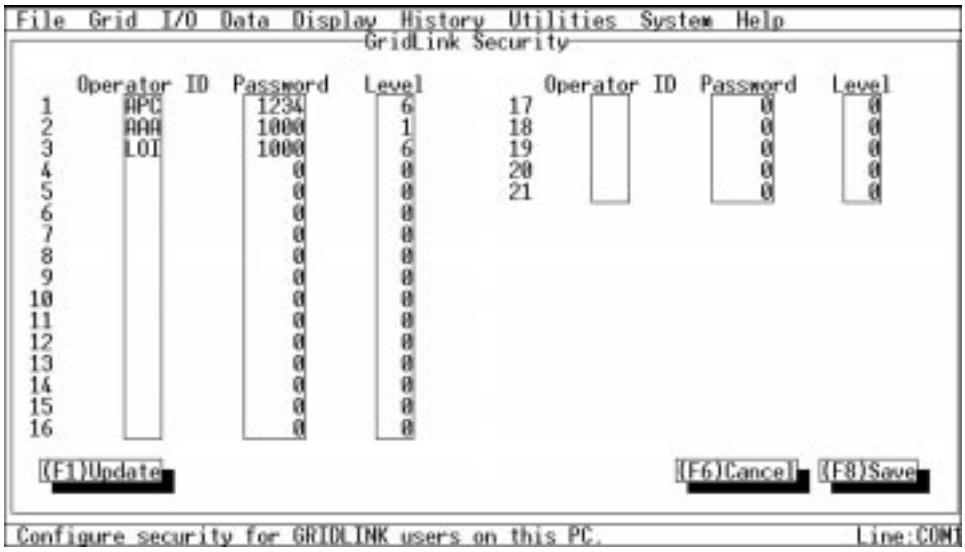

Figure 8-1. GRIDLINK Operator Security

Operator ID — The Operator ID must be three alphanumeric characters, typically the initials of the person who will be operating the GridBoss.

Password — The Password should be four numeric characters between 0000 and 9999.

Level — The Level must be a number from 0 to 6, where Level 0 is the lowest level.

> **Level 0** only allows access to the Help menu with limited actions allowed in the File menu, namely: Direct Connect, Print Configuration, and Exit.
>
> **Level 1, Level 2, Level 3** and **Levels 4** do not have access to the Utilities menu, but allow various levels of access to other options.
>
> **Level 5** and **Level 6** allow access to all menus and functions. Refer to Table 8-1.

Remember to press **(F8)Save** to retain your changes.

Table 8-1. GRIDLINK Security Levels

File[0]
- Direct Connect[0]
- GridBoss Directory[2]
- Quick Setup[1]
- New…[5]
  - DR[5]
  - LPP[5]
- Open..[5]
  - Event File[5]
  - Alarm File[5]
  - Minute History File[5]
  - 15 Minute History[5]
  - Daily History File[5]
  - Config[5]
- Collect GridBoss Data...[1]
  - All[1]
  - TOD Profiles*[1]
  - History[1]
  - Events/Alarms[1]
- Download...[1]
  - GridBoss Config. to Disk[1]
  - Disk Config. to GridBoss[1]
  - TOD Profiles*[5]
- Update Firmware[5]
- Update Hardware[5]
- Convert...[2]
  - Minute History File[2]
  - 15 Minute History File[2]
  - Daily History File[2]
- Print Configuration[0]
- GRIDLINK Security[6]
- Macros…[5]
  - Record Macro[5]
  - Play Macro[5]
  - Stop Recording[5]
- Exit[0]

GRID[1]
- Comm with LPP*[5]
- Regulator Control*[5]
- Holiday Dates*[5]
- Comm with DR**[5]
- Low Press Control**[5]

I/O[2]
- Analog Inputs[2]
- Analog Outputs[2]
- Discrete Inputs[2]
- Discrete Outputs[2]
- Pulse Inputs[2]

Data[3]
- FST...[3]
  - Register[3]
  - Editor[3]
- Soft Points[3]
- Radio Control[3]
- Opcode Setup[3]
- User List[3]

Display[2]
- New Display[2]
- Display on Disk[2]
- Monitor...[2]
  - Discrete Input[2]
  - Discrete Output[2]
  - Analog Input[2]
  - Analog Output[2]
  - Pulse Input[2]
  - Control Loop[2]

History[2]
- Setup[2]
- Min/Max[2]
- Minute[2]
- 15 Minute[2]
- Day[2]
- Events[2]
- Alarms[2]

Utilities[5]
- Security...[6]
  - GRIDLINK Operator[5]
  - GridBoss Logon[5]
- Macros...[5]
  - Record Macro[5]
  - Play Macro[5]
  - Stop Recording[5]
- GridBoss Memory[5]
- Calibration Values[5]

System[2]
- Clock[2]
- Information[5]
- Flags[5]
- Comm Ports[5]

Help[0]
- Getting Started[0]
- Keys[0]
- Help Contents[0]
- About[0]

[0] Low Security
[6] High Security
* DR Units Only
** LPP Units Only

8.2.2 GridBoss Logon

Select the GridBoss Logon option under Security in the Utilities menu to control which GRIDLINK users are allowed access to a connected GridBoss. In the screen that appears, you can specify the Operator ID, Password, and which port to secure for up to 16 different users. Refer to Figure 8-2.

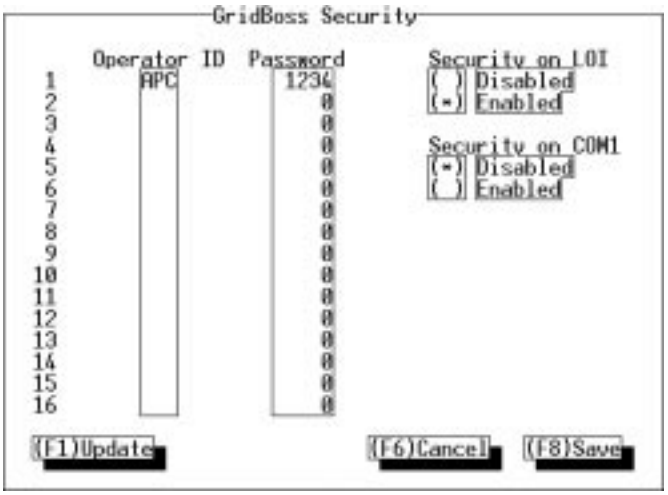

Figure 8-2. GridBoss Access Security

Operator ID — The Operator ID (three characters) and Password (four numbers) must match one of the entries in the GRIDLINK Security screen. If the GridBoss security is Enabled for the port through which you are trying to connect, and a matching Operator ID and Password are not found, you will not be allowed to connect to the GridBoss, although you still have access to off-line GRIDLINK functions (File and Help menus).

Password — The Password should be four numeric characters between 0000 and 9999.

Security on LOI — Security for the operator interface port (LOI) of a connected GridBoss can be turned ON or OFF for all users by selecting either the Disabled or Enabled option accordingly. By default, Security on LOI is Enabled.

Security on COM1 — Security for the host port (COM1) of a connected GridBoss can be turned ON or OFF for all users by selecting either the Disabled or Enabled option accordingly. By default, Security on COM1 is Disabled.

Remember to use the **(F8)Save** pushbutton to retain your changes in configuration memory.

8.3 MACROS

Select Utilities from the menu bar and then choose Macros. Use macros to record a series of keystrokes (mouse actions are ignored) that you perform. You can then replay the sequence on demand by using a "hot key" that you assign before recording the sequence. Refer to Section 8.3.4, **Example Macro**, on page 8-7. The macro options are:

- Record Macro
- Play Macro
- Stop Recording

8.3.1 Record Macro

In the Macros submenu, choose Record Macro. A dialog box appears for specifying the Macro File Name and the "hot key" keystrokes required to run the macro. Refer to Figure 8-3.

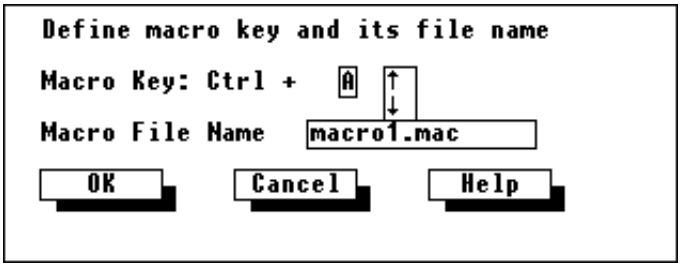

Figure 8-3. Record Macro

NOTE

Macros can typically be used only with the same GridBoss for which they were created, unless the units are identical. For example, if there is a difference in I/O points, you may have to record your macro again.

Macro Key — This reflects the keystrokes required to play the macro. CTRL plus the key you select plays back the macro you record. Select a key to use with the CTRL key.

Macro File Name — Enter a name for the macro you are recording, or use the default file name. The extension should always be `.mac`.

8.3.2 Play Macro

Use the Play Macro function to play a predefined macro. After choosing Play Macro, select the macro you desire to play and press **OK**. The macro plays back. You can also use the hot key you established in the Macro Key option when you recorded the macro to play back a macro. Refer to Figure 8-4.

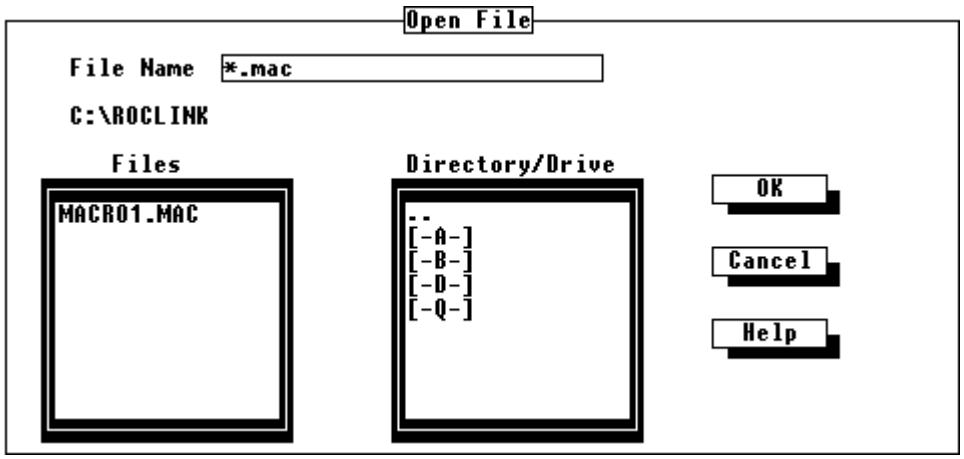

Figure 8-4. Play Macro

8.3.3 Stop Recording

This function stops recording the action or sequence of events that you are performing.

8.3.4 Example Macro

This section provides an example macro used to perform a Cold Start which restores the configuration from programmable ROM, clears the Alarm Log, Event Log, Grid Displays, FSTs, and History. This example also creates a hot key for the operator to press to start the macro. By using this macro, an operator can quickly perform the Cold Start function on multiple GridBoss units.

CAUTION

The Cold Start macro reloads all restart configuration data and also clears logs, displays, and FSTs. In addition, it may cause output changes, load new accumulator values, and disable user program tasks and User Data Types. Generally, a Cold Start should not be used on a GridBoss that is actively gathering data and performing control. Save or document all required data and parameter values that could be affected before performing the Cold Start.

NOTE

If you are currently connected to GRIDLINK, (F8)Save any data that you have currently changed.

1. Logon to **GRIDLINK**.
2. From the File menu, press the **Right Arrow** (→) **six** times to select the **Utilities** menu.
3. Press the **Down Arrow** (↓) to select **Macros…** and press **Enter**.
4. Press **Enter** to select **Record Macro**.
5. Type a letter to use with **Ctrl** as your Macro Key (hot key). For example, Ctrl+A.
6. Press **Tab three** times to use the default **Macro File Name** of macro*x*.mac.
7. Press **Enter**.
8. Press **Enter** to select Yes and override an existing Macro File Name if necessary.
9. Press **Alt** to select the File menu.
10. Press the **Right Arrow** (→) **seven** times to select the **System** menu and press **Enter**.
11. Press the **Down Arrow** (↓) **two** times to select **Flags** and press **Enter**.
12. Press **Tab** to select **Cold Start** and press **Enter**.
13. Press the **Down Arrow** (↓) **five** times to select **Restore config and clear all of above** and press **Enter**.
14. Press **Tab** to select **OK** and press **Enter**.
15. Press **(F8)** to initiate a **Save**.
16. Press **Esc** after the Save is complete.
17. Press the **Left Arrow** (←) and to select the Utilities menu.
18. Press the **Down Arrow** (↓) to select **Macros…** and press **Enter**.
19. Press the **Down Arrow** (↓) **two** times to select **Stop Recording** and press **Enter**.
20. Press your macro hot key combination (such as Ctrl+A) to test the new macro.

8.4 GRIDBOSS MEMORY

Select Utilities from the menu bar and then choose GridBoss Memory. A display appears that lets you specify the Segment and Offset of GridBoss memory that you want to view. The GridBoss only displays the Address field. When you enter numbers within the valid ranges of memory location and use the **Update** pushbutton, the display updates to show the contents of 256 bytes of memory. The hexadecimal (Hex fields) address and values are shown on the left, and the ASCII character equivalents are shown on the right. Refer to Figure 8-5.

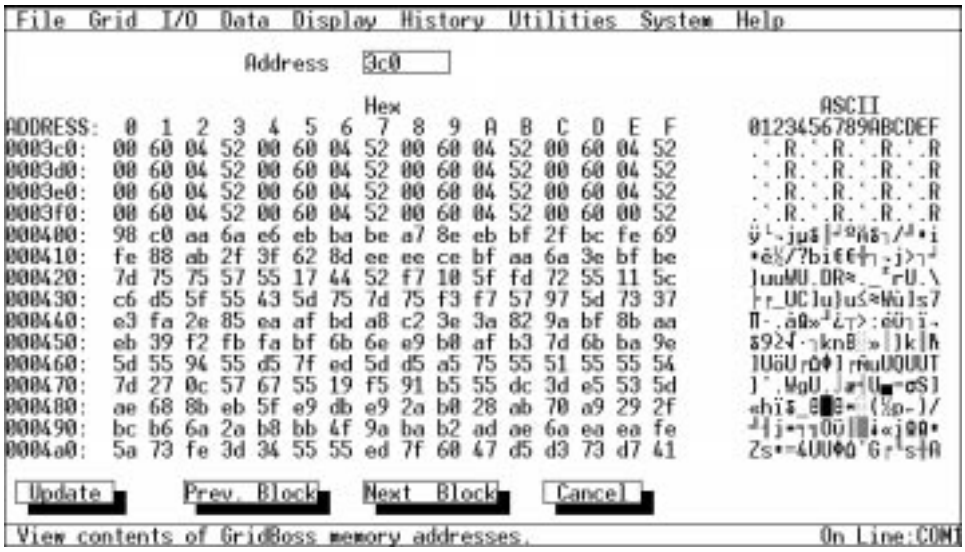

Figure 8-5. GridBoss Memory

Use the **Prev. Block** and **Next Block** pushbuttons to view the previous or next block (256 bytes) of memory. If you are viewing RAM, you can use the **Update** pushbutton to refresh the screen with the most recent values from the GridBoss.

8.5 CALIBRATION VALUES

Select Utilities from the menu bar and then choose Calibration Values. The screen that appears in Figure 8-6 lets you view all the calibration values for a specific point such as the Tag. Changes in the values cannot be made from this screen; this should be performed by using the Analog Input function. To calibrate, refer to the Section 4, AI Calibration.

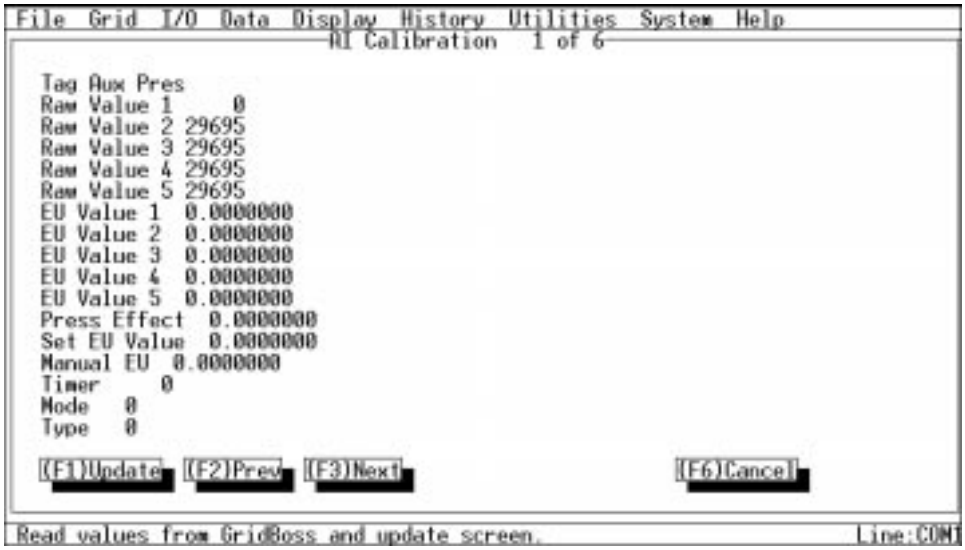

Figure 8-6. AI Calibration Values

Use the **(F2)Prev** and **(F3)Next** pushbuttons to view the calibration values for the other calibrated points.

The values that display for each point are: Tag, Raw Values 1 to 5, EU Values 1 to 5, Pressure Effect, Set EU Value, Manual EU, Timer, Mode, and Type. Note that some of these values do not necessarily apply to each point.

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SECTION 9 — THE SYSTEM MENU

9.1 SCOPE

This section describes how to view and configure system-level information for a GridBoss. The System menu contains options for setting the real-time clock, for viewing system information, for setting System Flags, and for configuring communications ports.

This section contains the following information:

Information	Section	Page Number
Clock	9.2	9-2
Information	9.3	9-3
Firmware Information	9.3.1	9-5
Revision Information	9.3.2	9-6
Flags	9.4	9-7
Comm Ports	9.5	9-10
Modem	9.5.1	9-12
RBX Features	9.5.2	9-13
Configuring Report-by-Exception	9.6	9-16
RBX Configuration Overview	9.6.1	9-16
Configuring the Communications Port Basic Parameters	9.6.2	9-16
Configuring the Communications Port RBX Parameters	9.6.3	9-17
Configuring Basic Alarming Parameters	9.6.4	9-18
Configuring RBX Alarming Parameters	9.6.5	9-19
Communications Overview	9.7	9-20
Verifying Host Communications	9.7.1	9-21

9.2 CLOCK

The internal real-time clock provides time-stamping and control of the historical databases, Event Log, and Alarm Log. To set the clock, select the Clock option from the System menu. The GRIDLINK software responds with the display shown in Figure 9-1.

NOTE

Make sure that the clock is correctly set before placing the GridBoss into service and beginning to log values, events, and alarms.

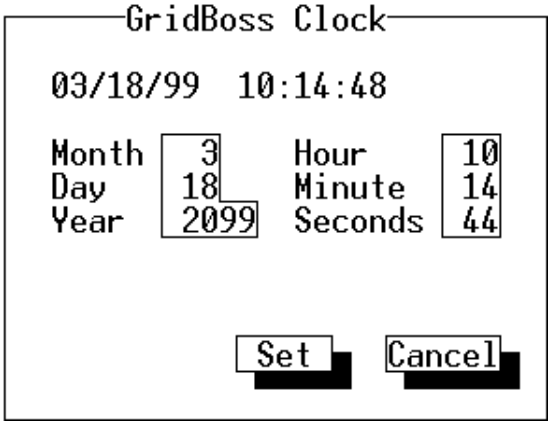

Figure 9-1. Clock Display

The time values in the display are updated approximately every second. To set the clock, proceed as follows:

1. Select **Clock** from the GRIDLINK System menu.

2. Use the cursor or the TAB key to highlight the value to be changed. Type in the desired value. In addition to the **Seconds**, **Minutes**, **Hour**, **Day**, **Month**, and **Year**.

3. Press **Set** to save the current setting or **Cancel** to cancel the changes. Keep in mind that this update replaces any changes made since the last save.

NOTE

The time stamp in the GridBoss reflects the time at the end of the period — not at the beginning. Data collected from 0800 to 0900 is time-stamped 0900, not 0800.

In the spring, the historical log skips an hour and in the fall, a duplicate time value will be entered.

9.3 INFORMATION

The System Information options define values for certain system variables and the Address and Group that differentiates each individual GridBoss. Other system variables set in the System Information screen must be established for a particular application. To set the variables, select Information from the System menu. The System Information screen displays system information about the GridBoss, including firmware, flash version numbers, and various other installed options. The GRIDLINK software responds with the display in Figure 9-2.

NOTE

If you make changes in the display and then try to quit without saving the changes, a message box pops up. You can either press Yes to save the changes or No to disregard the changes.

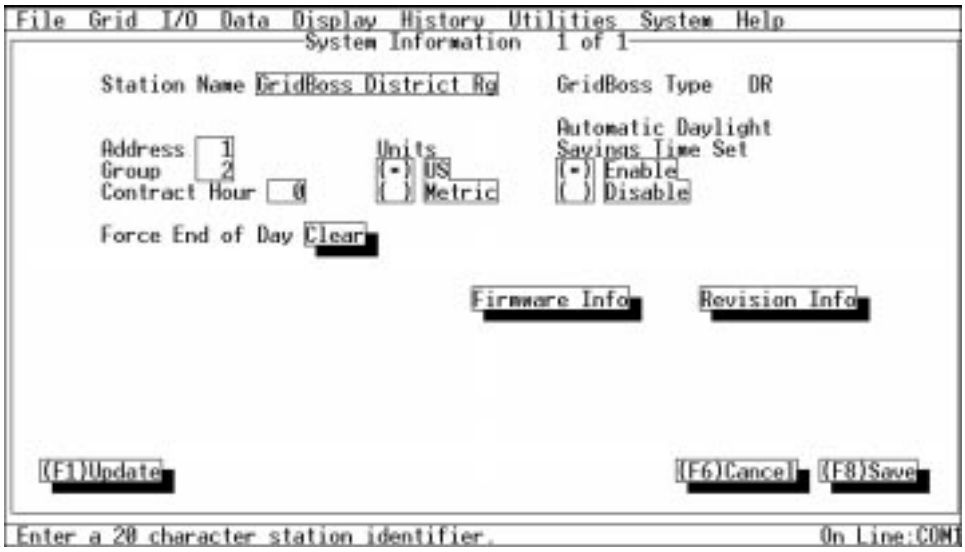

Figure 9-2. System Information

Station Name — A 20-character name or location of the GridBoss. The name is logged with the historical database for easy site identification. Each GridBoss should have a unique Station Name. Refer to Table 9-1.

GridBoss Type — Identifies the type of GridBoss currently active. DR is District Regulator and LPP is Low Pressure Point.

Address — Identifies this specific, individual GridBoss controller for communication purposes, typically to a Host (such as GridManager) that polls the GridBoss. **The Address can be assigned a value from 1 to 247.** 240 is the system default Address and should not be used. 200 is the default for an LPP Controller. The Address of each GridBoss should be a unique number to differentiate between all units in a communications system. Refer to Table 9-1.

When a Host asks a specific GridBoss controller for information, the Host searches the network for the GridBoss with that specific Address. The Host searches the Address field of every GridBoss on the network until it finds a match.

Group — Identifies a set of GridBoss controllers for communication purposes, typically to a Host that polls the GridBoss**. The station Group can be assigned a value from 1 to 247.** All of the GridBoss controllers addressed as an area in the Host have the same station Group. 240 is the system default Group and should not be used. Refer to Table 9-1.

Table 9-1. System Information Example

Station Name	Address	Group	Phone from LPP	Phone from Host	Host from Station
LPP1	1	2	N/A	9-555-0001	555-1000
DR1	2	2	555-0002	9-555-0002	555-1000
DR2	3	2	555-0003	9-555-0003	555-1000
LPP2	1	3	N/A	9-1-515-555-0004	1-515-555-1000
DR3	2	3	555-0005	9-1-515-555-0005	1-515-555-1000

Table 9-1 can be used to configure the Host using the GridBoss Station Name, Address, Group and Phone from Host information.

Contract Hour — The time when values are totaled for a single day of production, accumulators are cleared, and data is logged to the Daily History database. The Contract Hour is based on a 24-hour clock with midnight as the "0" hour.

Units — Select either US (English/Imperial) units or Metric units.

Force End of Day — Pressing the Clear pushbutton causes the current day and its values to be logged into memory for all historical data. It also resets the daily and 15-minute accumulators. Force End of Day uses one of the 35 possible slots for storing daily and 15-minute data.

Firmware Info — Refer to page 9-5.

Revision Info — Refer to page 9-6.

Press **(F8)Save** to save any changes you have made. Press **(F1)Update** to update the current screen to display the new changes. Press **(F6)Cancel** to cancel any changes. Press **Advanced Features** to display advanced System Information features.

NOTE

Most of the values that can be edited in this display are saved to programmable memory when "Write to Internal Config Memory" is activated from the GridBoss Flags display. Refer to Section 9.4.

9.3.1 Firmware Information

To set additional System Information variables, select Information from the System menu. When you are at the System Information screen, shown in Figure 9-2, use the **Advanced Features** pushbutton. A dialog box appears that displays the number of other device-specific parameters such as the version, serial number, history points, and installed RAM. Refer to Figure 9-3.

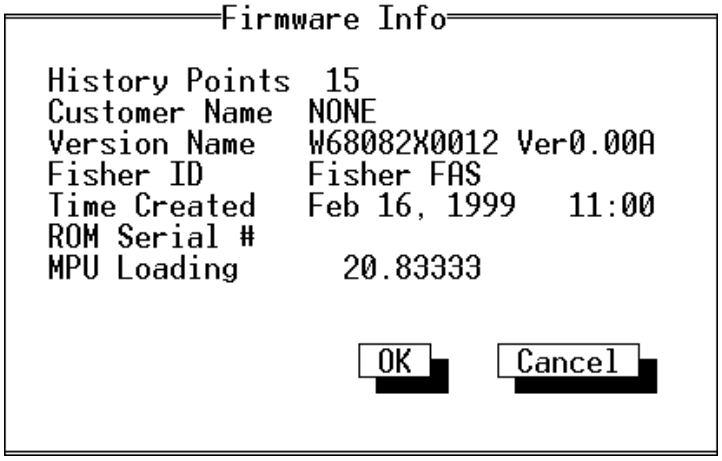

Figure 9-3. Firmware Information

History Points — The number of database points contained in the Base RAM area. This field accepts a value from 0 to 15 points. The default value is 15.

Customer Name — The name of the customer for which the ROM version was created. The customer name can be set at the factory at the time of ordering or in the field by a Fisher representative.

Version Name — Displays the part number and version of the installed firmware.

Fisher ID — Identifies the creator of the firmware.

Time Created — Date and time when the installed firmware was created.

ROM Serial # — The serial number assigned by the factory to the read-only memory (ROM) installed in the GridBoss.

MPU Loading — Displays the percentage of time that the processor was busy (not in the wait task) over the last minute. The data for this field is updated approximately every minute. Press the (F1)Update pushbutton to view the new value. The default value is 7.67.

9.3.2 Revision Information

The Revision Information pushbutton is available in the main System Information screen. The Revision Info screen always displays the Firmware Version number and any other accessories, which may be connected to the GridBoss. Refer to Figure 9-4.

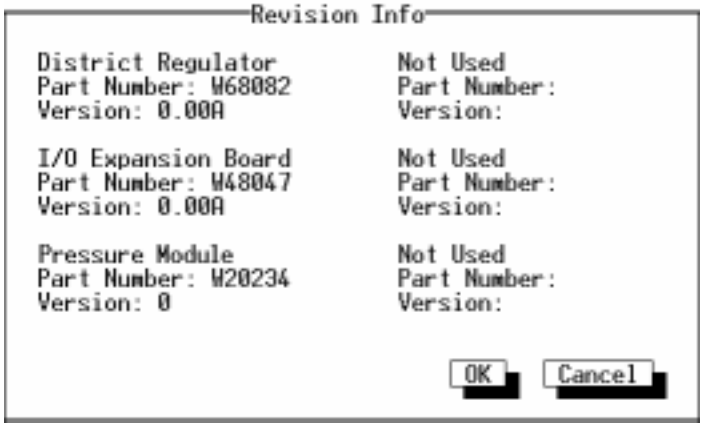

Figure 9-4. Revision Information

District Regulator or Low Pressure Point – Type of firmware installed in the GridBoss Controller.

Not Used – When this field displays Not Used, no accessory is installed. This field displays the name of an accessory if one is installed. For example, this field may say I/O Expansion Board or Turbine Interface.

Part Number – Part number of the accessory or firmware.

Version – Version control number of the accessory or firmware.

9.4 FLAGS

Select System from the menu bar and then choose Flags. Refer to Figure 9-5. The GridBoss System Flags allow access to control bytes that affect various aspects of system operation. Be sure you understand the function of the Flags before changing them. Press the appropriate pushbutton (or highlight and press Enter) to "set" the Flag. The action implied by the Flag is performed when you press **(F8)Save**.

CAUTION

Be very careful when using the GridBoss Flags. Certain Flags can cause data to be lost, parameter values to be changed, or configuration memory to be cleared.

Figure 9-5. GridBoss Flags

Press **(F1)Update** to request the most recent values from the GridBoss to refresh the current display. Press **(F8)Save** to save all changes. Press **(F6)Cancel** to cancel all actions since the last save and close the currently selected display screen. Press **Advanced Features** to display extended parameters or functions.

Warm Start — When **Yes**, the GridBoss is initialized from RAM if it is valid. If the RAM is valid, databases and FSTs remain intact.

If the RAM does not have a valid configuration written in it, the configuration last saved to programmable ROM is used. This save is performed using Write to Internal Config Memory in the GridBoss Flags screen.

When the Warm Start is complete, the pushbutton automatically reverts to **No**. Press **(F1)Update** to view the current status.

Cold Start — In a Cold Start, the GridBoss is initialized from the restart configuration saved in programmable ROM (internal configuration memory or Flash memory). If the configuration memory does not have a valid configuration written in it, the factory defaults in ROM are used. Use the Cold Start when a GridBoss is performing erratically, the memory appears to be corrupted, or when you desire to reset the unit to the last saved configuration. The following paragraphs detail how the various GridBoss units react to a cold start. Select the check box in the dialog box shown in Figure 9-6 to perform the desired Cold Start option.

CAUTION

The Cold Start reloads all restart configuration data and may also clear logs, displays, and FSTs. In addition, it may cause output changes, load new accumulator values, and disable user program tasks and User Data Types. Generally, a Cold Start should not be used on a GridBoss that is actively gathering data and performing control. Save or document all required data and parameter values that could be affected before performing the Cold Start.

Logs, GridBoss displays, and FSTs may be cleared by using the appropriate Cold Start option. If a Write to Internal Config Mem (which includes the FST and FST point) had been performed before the Cold Start, the saved FST will be reloaded in place of the one that was cleared. If an FST was running when the FST was saved, the FST will likewise be running when the FST is reloaded by the cold start. Note that FST registers are always cleared upon restart; therefore, use softpoints to load initial values for the FST.

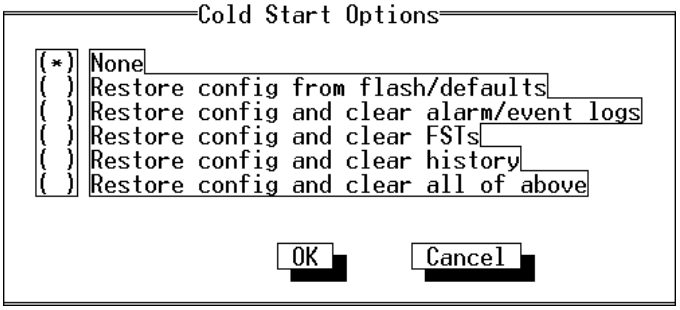
Cold Start Options
(*) None
( ) Restore config from flash/defaults
( ) Restore config and clear alarm/event logs
( ) Restore config and clear FSTs
( ) Restore config and clear history
( ) Restore config and clear all of above
OK
Cancel

Figure 9-6. Cold Start Options

Clear Internal Config Memory — When the pushbutton for Clear Internal Configuration Memory is **Yes**, all saved restart configuration data contained in programmable ROM will be cleared upon saving; only factory defaults are retained. When the memory is cleared, the pushbutton reverts to **No**.

Write to Internal Config Memory — When the pushbutton for Write to Internal Configuration Memory is Yes, most configuration settings, including the current states of the GridBoss Flags and calibration values (FST is also saved), are loaded into programmable ROM as the new restart configuration. See the Cold Start parameter for more information. When the loading is complete, the Internal Config Memory Write Status indicator (on the next line of the display) shows "Complete" and the pushbutton reverts to No (use the Update pushbutton to view).

CAUTION

When a Write to Internal Config Memory is performed, all user flags are maintained at their current status during this process and all incoming communications are temporarily suspended. FSTs are temporarily suspended, but restart where they were suspended.

Write Status — When the pushbutton for Write to Internal Config Memory is **Yes**, most configuration settings, including the current states of the GridBoss Flags and calibration values, are loaded into programmable ROM (upon performing a save) as the new restart configuration. When the loading is complete, the Write Status indicator (on the next line of the display) shows "Complete" and the pushbutton reverts to **No** (use the **Update** pushbutton to view). The write process can take from a second to a minute or more for a large configuration.

Set RTS High for 30 secs — Set the pushbutton to **Yes** and then press (F8)Save to activate the RTS (Request-to-Send) signal for either the local operator interface port (LOI) or the COM1 port. The RTS signal turns on for 30 seconds. The pushbutton reverts to **No** (use the **Update** pushbutton to view).

CRC Check — Select **Enabled** to perform CRC (Cyclical Redundancy Check) checking on serial communications.

I/O Scanning — When **Enabled**, I/O is in normal scan mode. When **Disabled**, all I/O scanning is stopped and the last values are used until the scanning is resumed.

9.5 COMM PORTS

Select System from the menu bar and choose Comm Ports. A screen appears similar to that shown either in Figure 9-7. Each communications port has a unique screen with a set of parameters. Use the **(F2)Prev** and the **(F3)Next** pushbuttons to page between screens.

The GridBoss Comm Ports screen is used to set up communications ports available for the GridBoss and not the personal computer (PC). PC communication ports are set up using the GridBoss Directory function in Section 2.

The communication ports located on the GridBoss provide a data link to the GRIDLINK software, other GridBoss units, and Host systems. The following types of communications are possible:

- EIA232 serial communications.
- EIA422 party-line serial communications.
- EIA485 multi-point serial communications.
- Radio modem communication.
- Leased-line modem communications.
- Dial-up modem communications.

The communication ports of the GridBoss provide a link to computers, such as one running the GRIDLINK software or a Host computer. The LOI port (labeled Local Port on the screen) is standard on every GridBoss and displays when you first select Comm Ports from the System menu. Press (F3)Next to display the first Host port. The Host port (COM1) requires activation by the installation of an optional plug-in communications card. COM2, COM3, and COM4 are used to define the communications port used by the PC. Therefore, if the GridBoss is transmitting out of COM1 or the LOI port, it can communicate to the PC using the PC COM1, COM2, COM3, or COM4 port.

The configuration of all communications ports is saved to programmable ROM when **Write to Internal Config Memory** is activated from the GridBoss Flags display.

After configuring the Comm Port, select the **(F8)Save** pushbutton to save the data to the GridBoss. Other options include **(F4)Copy** and **(F5)Paste** functions to copy configuration from one communication port to another and **(F2)Prev** and **(F3)Next** functions to move between communication ports. Use **(F1)Update** to view saved changes. Press **(F6)Cancel** to cancel any changes you have made.

Figure 9-7. GridBoss Comm Ports Screen

Comm Tag — A 10-character name for identification of the communications port located in the GridBoss.

Comm Board (Comm ports only) — Indicates if a communications board is installed or not.

Baud Rate — Transmit and receive data baud rate in bits per second. The default value is 9600 baud.

Parity — Parity checks to be performed by the communications controller. The default value is None.

Data Bits — The number of data bits contained in a character. The default value is 8.

Stop Bits — The number of stop bits contained in a character. The default value is 1.

RBX Mode (External Comm ports only not including LOI) — If you are using the RBX Alarming feature (alarm call-in), select Enabled and then use the RBX Features or Advanced Features pushbutton or Advanced Features to configure the Comm Port to support RBX activity.

Key On Delay — Defines the number of seconds (in 0.01 second increments) to delay before turning the RTS signal on once a valid message has been received. For some older radios, the Key On Delay may need to be set as high as 0.2 second. For newer radios designed for data transmission, no more than 0.02 second should be required. 10 millisecond increments are used.

Key Off Delay — Delay intervals defining the period to delay before turning the RTS signal off once a valid message has been received. The turnaround time of 0.01 second should be sufficiently long for most radios. 10 millisecond increments are used.

Valid Receive Ctr — The Valid Receive Counter logs the number of valid Opcodes received by the GridBoss on this communication port. This counter can be preset to a value or cleared.

Modem — Refer to page 9-12.

RBX Features — Refer to page 9-13.

9.5.1 Modem

When using a dial-up modem to communicate to a Host through the communications port, press the Modem pushbutton in the GridBoss Comm Ports screen. Press (F3)Next to view COM1 if the Modem button is not present on the first (LOI) screen. A dialog box displays as shown in Figure 9-8.

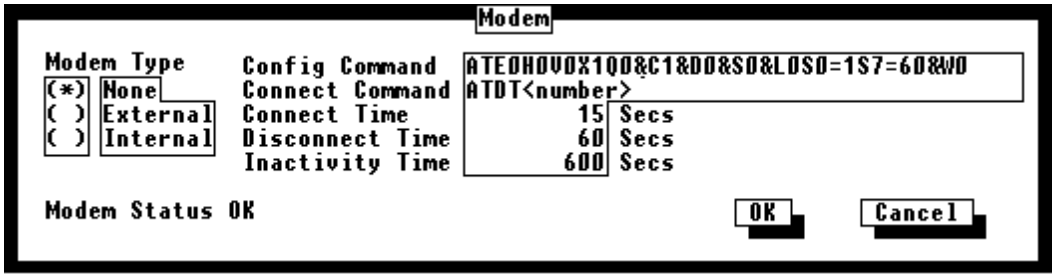

Figure 9-8. Modem Configuration

Modem Type — Choose **None** for a serial link to the Host, **External** for a modem that is external to the GridBoss, or **Internal** for the GridBoss modem communications card. For a GridBoss, an internal card will be automatically recognized and the Baud Rate automatically set to 2400.

Config Command — Type in the characters required to initialize the modem. Refer to the manufacturer's literature. For an internal modem, use the default value or the modem card may not work. The default Config Command modem string is:

```
ATE0H0V0X1Q0&C1&D0&S0&L0S0=1S7=60&W0
```

Connect Command — Type in the Hayes-style command required to contact the Host. This is the Host's telephone number. Typically, this is the command ATDT followed by the telephone number. This parameter is required only for dial-out operations, such as for RBX Alarming. Refer to Table 9-1.

Connect Command `ATDT 18005151212`

where: `ATDx` = dial the number 1-800-515-1212

`T` = tone dialing

NOTE

The telephone numbers must include the exact sequence required at each Station and at the Host. In certain cases the telephone numbers are the same; however, in other cases access numbers such as (9) and area codes (1-212) may be required. Refer to Table 9-1.

Connect Time — This parameter determines the amount of time that the GridBoss waits after initiating a call to receive a connect message from a device at the other end (typically the Host) before it terminates the call. If a successful connection is made, then the Disconnect Time begins. The default value is 60 seconds.

Disconnect Time — This parameter determines the amount of time that the GridBoss, once it is connected and in off-hook status (a valid receive signal was seen), waits for further activity on the line before it hangs up. This timer resets and starts counting down after each valid receive signal. The default value is 60 seconds.

Inactivity Time — This parameter determines the amount of time that the GridBoss, after there was an invalid signal sensed (the GridBoss is still in the on-hook status), waits for a valid receive signal before it resets the modem. This parameter is useful for resetting the modem in situations such as when the modem has connected at a baud rate that the GridBoss itself does not recognize. The default value is 600 seconds.

Modem Status — If the modem appears to be powered up and operating, this read-only parameter indicates OK.

9.5.2 RBX Features

The RBX alarming feature is available for the Host communication ports. This feature allows the GridBoss to call-in to a Host computer when an alarm occurs. Refer to Section 9.6.1, RBX Configuration Overview, on page 9-16.

If you are using the RBX Alarming feature, press the **RBX Features** pushbutton displayed in the GridBoss Comm Ports screen to display the dialog box similar to the one shown in Figure 9-9. You can now configure the port for RBX, as well as for Store and Forward.

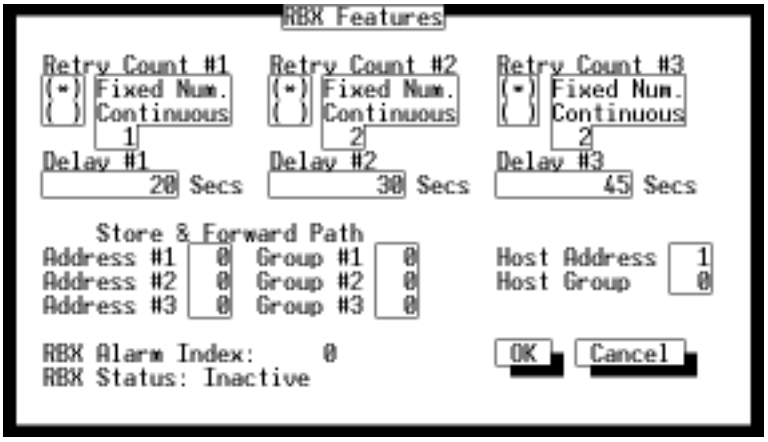

Figure 9-9. RBX Features

Retry Counts — Three Retry Counts are possible: Retry Count #1, Retry Count #2, and Retry Count #3. Retry Counts are the number of retry times a message is repeated if a valid response is not obtained on the first attempt. Note that the three Retry Count parameters are each with an associated Retry Delay parameter. This allows you to set up different length delays for successive retry. Selecting **Fixed Num.** allows you to enter a value for how many retry times a message is repeated after the fist unsuccessful attempt. Note that a "0" entry causes no retries. Selecting **continuous** (255) causes continuous retries that can only be stopped when the Host clears the RBX alarm. The default values are: Retry Count #1 = 1, Retry Count #2 = 2, and Retry Count #3 = 3.

For example, if you set Retry Count #1 to "2", Retry Delay #1 to "10", Retry Count #2 to "1" and Retry Delay to "20", then after the first unsuccessful attempt to communicate with the Host, the RBX Features would try two more times after waiting 10 seconds each time, and once more after waiting 20 seconds.

Delay — Three Delays are possible: Delay #1, Delay #2, and Delay #3. Delay defines the delay in seconds between attempts to transmit an RBX message. Note that there is a Delay parameter associated with each Retry Count parameter. Refer to the previous example. The default values are: Delay #1 = 20, Delay #2 = 30, and Delay #3 = 45.

Extra Key On Delay — Defines an additional amount of time to delay transmitting an RBX message after turning the RTS signal on. Enable the parameter, and then specify the number of seconds. This parameter is used for radio communications.

RBX Alarm Index — This is a read-only parameter that indicates alarms currently being reported through RBX.

RBX Status — This is a read-only parameter that indicates the status of RBX messaging, either Active or Inactive. Active indicates that an RBX alarm is being processed.

Host Address and Host Group — Enter the Address and Host Group number of the Host to which the RBX feature is communicating. The defaults of "1" and "0" are used by most Host driver software. This Host Address is also the destination address when Store and Forward is used. Valid entries include 0 to 247.

Store and Forward Path — Enter the Address and Group numbers of the GridBoss devices that will need to receive this RBX message and forward it on to the next device to extend the communications path. You may also specify addresses for other devices that support the GridBoss protocol. The device specified by the last non-zero Address/Group then sends the message to the Host specified by the previous parameter. Valid entries include 0 to 247.

Refer to Configuring Report-by-Exception on page 9-16.

9.6 CONFIGURING REPORT-BY-EXCEPTION

You can configure spontaneous Report-by-Exception (RBX) to allow the GridBoss to monitor for alarm conditions and, upon detection of an alarm, automatically report the alarm to a Host computer. This can be performed over any kind of communications link — dial-up modem, radio, or serial line — as long as the Host is set up for receiving field-initiated calls. This appendix contains the following sections:

9.6.1 RBX Configuration Overview

The major steps for configuring RBX in the GridBoss must be performed to prevent "nuisance" alarms from being sent out during configuration. The major steps are:

- **Configuring the Communications Port Basic Parameters** — Configure the GridBoss Host communications port (COM1 Port) to match the communication parameters of the receiving Host device. Refer to Section 9.6.2.
- **Configuring the Communications Port RBX Parameters** — Enable the RBX Mode parameter for the communications port and configure the RBX Features. Refer to Section 9.6.3.
- **Configuring Basic Alarming Parameters** — Enable and configure the Alarms for each point that you want to monitor through RBX Alarming. Refer to Section 9.6.4.
- **Configuring RBX Alarming Parameters** — Select the type of RBX Alarming desired for each alarm to be monitored. Refer to Section 9.6.5.

9.6.2 Configuring the Communications Port Basic Parameters

The first major step for RBX Alarming is to ensure that the GridBoss port for communicating with the Host computer is properly configured.

The communication ports located on the GridBoss provide a data link to the GRIDLINK software, other GridBoss units, and Host systems.

The Host communications port is configured using GRIDLINK. From the System menu, select **Comm Ports** to display the **GridBoss Comm Ports** screen. Refer to Figure 9-10. The GridBoss Comm Ports screen is used to set up communications ports available for incoming or outgoing communications with the GridBoss and not the personal computer (PC).

Regardless of whether the link to the Host computer is being performed through a radio, a serial line, or a telephone line modem, the parameters on this screen need to be set accordingly. Refer to Section 9.5, Comm Ports, on page 9-10 for parameter details.

If a modem link is being used, make sure that the modem parameters are properly configured. Pay special attention to the dial-out parameters for the Connect Command (Host telephone number) and the Connect Time. Refer to Section 9.5.1, Modem, on page 9-12 for detailed information on each parameter.

NOTE

Modem parameters are accessed by pressing the Modem pushbutton.

All parameters on the GridBoss Comm Ports screen must match those of the connected radio, telephone modem, or serial communications device.

Figure 9-10. Configuring the Basic Communication Parameters

9.6.3 Configuring the Communications Port RBX Parameters

The next major step is to set up RBX for the Host communications port. Enable the RBX mode, and then set up the RBX parameters. Start by selecting Comm Ports from the System menu to display the GridBoss Comm Ports screen, as shown in Figure 9-10.

In the Comm Ports screen, select **Enabled** for the **RBX Mode**. Then press the **RBX Features** pushbutton and configure the parameters in the dialog box (see Figure 9-11). Refer to Section 9.5.2, RBX Features, on page 9-13 for detailed information on each parameter. Be sure to press (F8)Save before exiting this screen.

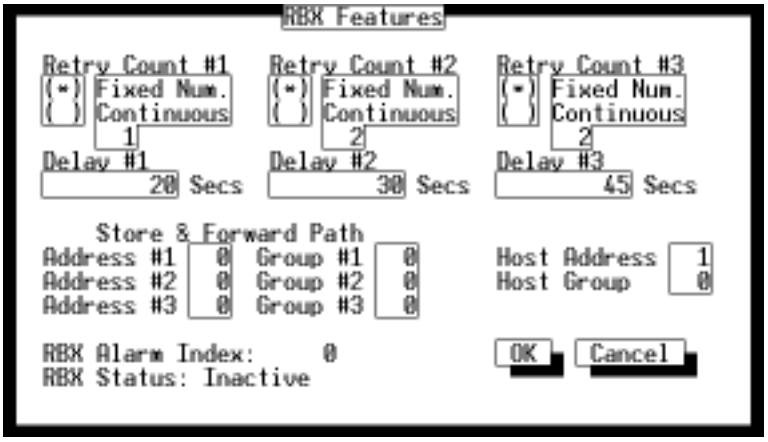

Figure 9-11. Configuring the RBX Communication Parameters

9.6.4 Configuring Basic Alarming Parameters

When using RBX Alarming, you must ensure that the alarms are Enabled and configured for each point that you want to monitor through RBX Alarming. Configure the alarm parameters such that an alarm occurs only when desired.

For example, assume you want to monitor the meter differential pressure for RBX Alarming.

Select AI from the I/O menu, and with Point Number A1 displayed, make sure that the **Alarming** parameter is set to **Enabled**. Refer to Figure 9-12.

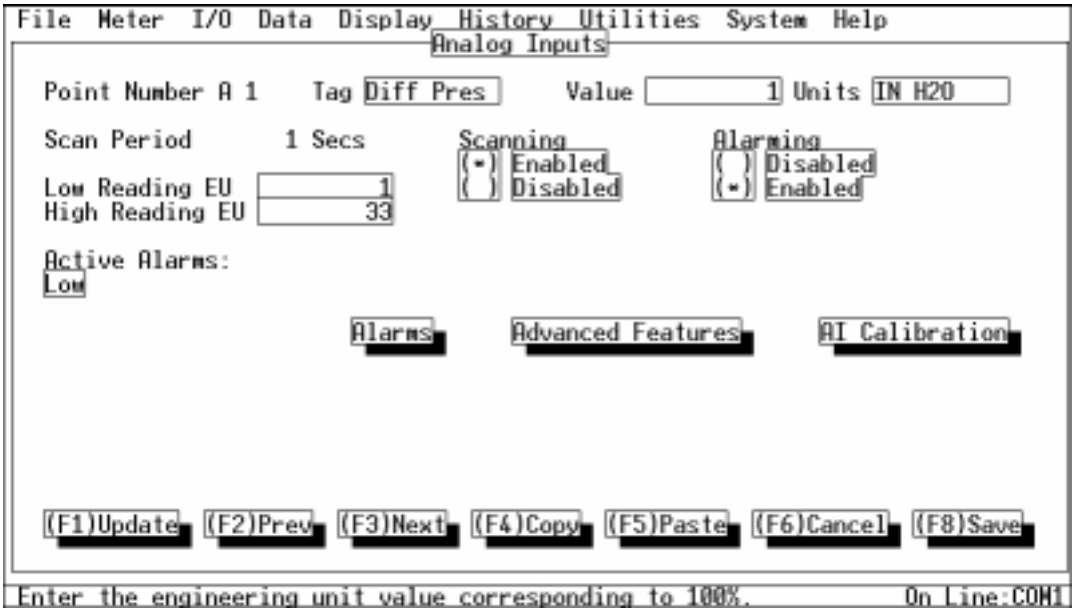

Figure 9-12. Enabling Alarming

Next, press the **Alarms** pushbutton, and ensure that the limits on the various alarms are set where you want them. Refer to alarm information in Section 3 or 4 for further details.

For our example of using the differential pressure alarm, configure the Low Alarm, High Alarm, LoLo Alarm, HiHi Alarm, and Rate Alarm limits as well as the Alarm Deadband accordingly such that an alarm occurs only when desired. Refer to Figure 9-13.

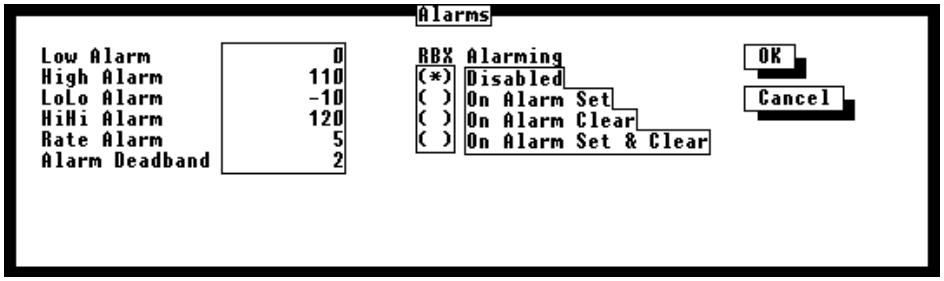

Figure 9-13. Establishing RBX Alarming

9.6.5 Configuring RBX Alarming Parameters

The last step in setting up RBX Alarming is to select the type of alarming desired for each RBX alarm monitored. Before you do this, you may want to **make sure that each point to be monitored for RBX Alarming is not currently in alarm**; otherwise, the GridBoss will immediately attempt to contact the Host.

To configure RBX Alarming for a point, use the Alarms dialog box and change the RBX Alarming parameter to: On Alarm set, On Alarm Clear, or On Alarm Set & Clear. Refer to Figure 9-13.

Disabled — Select Disabled under RBX Alarming to turn this option OFF.

On Alarm Set — When the point enters an alarm condition, the GridBoss generates a Report-by-Exception message and sends it to the receiving Host device.

On Alarm Clear — When the point leaves an alarm condition, the GridBoss generates a Report-by-Exception message and sends it to the receiving Host device.

On Alarm Set & Clear — In either condition, a Report-by-Exception message generates and sends it to the receiving Host device.

After configuring RBX functions, use **Write to Internal Config Memory** in the GridBoss Flags display to save I/O configuration to programmable ROM in case you must perform a Cold Start. Refer to Section 9.4, Flags, on page 9-7.

9.7 COMMUNICATIONS OVERVIEW

The GridBoss system consists of LPP units, DR units and a Host computer system. Both the LPP and DR units communicate with the Host Computer. Communication can be originated by the Host computer or by the LPP/DR units as an RBX. Refer to Section 9.6, Configuring Report-by-Exception, on page 9-16.

The LPP can communicate with up to five DR units. Each DR contains information about the LPP that validates the communication.

In each LPP, the System>Information screen is used to enter the Station name, Address and Group of the LPP. Refer to Section 9.3, Information, on page 9-3. The System>Comm Ports>Modem screen is used to enter the Host telephone number (Connect Command). Refer to Section 9.5.1, Modem, on page 9-12.

In each LPP, the Grid>Comm with DRs is used to configure the DR Tag name, DR Address, DR Group and telephone number to the DR (DR Connect Command). Each DR must be individually configured. Use the (F2)Prev and (F3)Next pushbuttons to view each DR configuration. The Comm with DRs screen is detailed in Section 3.

In each DR, the System>Information screen is used to enter the Station name, Address and Group of the DR. Refer to Section 9.3, Information, on page 9-3. The System>Comm Ports>Modem screen is used to enter the Host telephone number (Connect Command). Refer to Section 9.5.1, Modem, on page 9-12.

In each DR, the Grid>Comm with LPP screen is used to configure the LPP Tag name, LPP Address and LPP Group of the LPP assigned to control this DR. The Comm with LPP screen is detailed in Section 3.

It is recommended that the DR and LPP configuration information along with the communications parameters such as Baud Rate be configured **before** the units are deployed in the field. Each unit should be marked or labeled. This allows further configuration from a central location. The Sensor Module transducer calibrations should be recorded and if known, should be configured. It is also useful to synchronize the Date and Time in each unit. Refer to New>DR Configuration and New>LPP Configuration in Section 2.

9.7.1 Verifying Host Communications

As each unit is installed in the field, the communications with the Host and between the LPP and DRs should be verified by having the Host call the units (Poll Region or Poll Units). After an LPP and its assigned DRs are installed, the Host can call the LPP. Use the Force an Update pushbutton in the LPP screen to force the LPPs to contact the DRs. The Host disconnects waits a few minutes and then calls the DR again. In the DR Grid>Comm with LPP screen, the Last LPP Comm Time field shows if the call from the LPP to the DR occurred. If the communications failed, a Comm Failed message appears. If communications failed, check the telephone number (DR Connect Command), Address, and Group information in the DRs and the LPP to verify all values. Each communication link between the LPP and the DRs should be tested. This ensures system performance and prevents annoying calls to a wrong number.

Communications from the DR or LPP units to the Host can be tested by enabling RBX alarming and causing an alarm. Refer to Section 9.6, Configuring Report-by-Exception, on page 9-16.

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SECTION 10 — THE HELP MENU

10.1 SCOPE

This section describes how to locate and use the on-line help available through the GRIDLINK software. The GRIDLINK on-line help system should be used in conjunction with the GRIDLINK User Manual and other instruction manuals.

This section contains the following information:

Information	Section	Page Number
Getting Started	10.2	10-2
Using Help	10.2.1	10-2
Context-Sensitive Help	10.2.2	10-2
Index Help	10.2.3	10-3
Keys	10.3	10-3
Help Contents	10.4	10-4
About	10.5	10-5

As mentioned in Section 1, the major help features in the GRIDLINK software are:

- The Help menu
- Context-sensitive help
- The Status Line

The Help menu provides on-screen information about getting started with the GRIDLINK software, performing keyboard operations, using the Help index, and displaying the GRIDLINK Version number. For more information on context sensitive help and the Status Line, refer to Section 1.

To get help using the menu structure, select Help from the GRIDLINK menu bar (or press the letter "e" when nothing but an activated menu bar is displayed). Select an item in the Help menu. A help screen appears on the screen. If there is more information than will fit in the help window, use the **Page Down** and **Page Up** pushbuttons at the bottom of the help screen to view additional of the information. You may also use the text scrolling keys to view information. For information on accessing help for using keys, refer to Section 10.3 on page 10-3.

To leave the Help window and return to where you were, use the **Cancel** pushbutton or press the ESC key.

10.2 GETTING STARTED

To acquire help on Getting Started with the GRIDLINK software, select Help from the menu bar and then choose Getting Started. A Help dialog box appears as shown in Figure 10-1. This dialog box provides details on using Help and using the GRIDLINK menus.

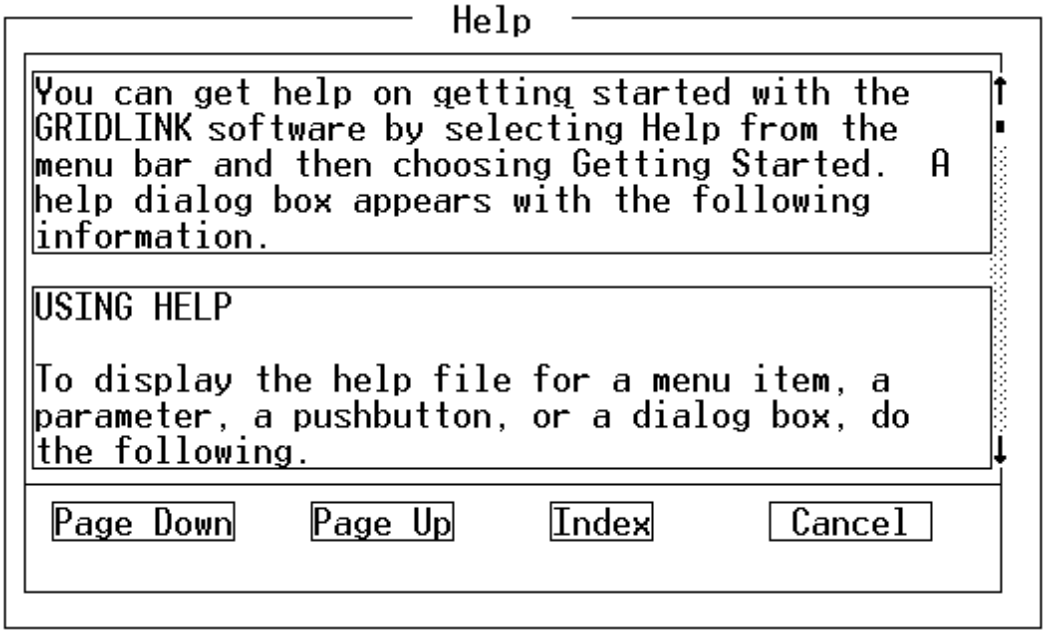
Help
You can get help on getting started with the GRIDLINK software by selecting Help from the menu bar and then choosing Getting Started. A help dialog box appears with the following information.
USING HELP
To display the help file for a menu item, a parameter, a pushbutton, or a dialog box, do the following.
Page Down
Page Up
Index
Cancel

Figure 10-1. Getting Started

10.2.1 Using Help

One of the topics covered in the **Getting Started** dialog box is how to use the help system. Both context-sensitive and indexed help are explained (see Sections 10.2.2 and 10.2.3). Help available from the menu structure, such as the Getting Started menu item, is obtained in the same way as other menu items.

10.2.2 Context-Sensitive Help

To display context-sensitive help on a menu item, a parameter, or a pushbutton, do the following. With the item, parameter, or pushbutton highlighted, press F9. A help window (dialog box) appears on the screen as shown in Figure 10-2. If there are more lines of text than will fit in the help window, you can use the **Page Down** and **Page Up** pushbuttons at the bottom of the help window.

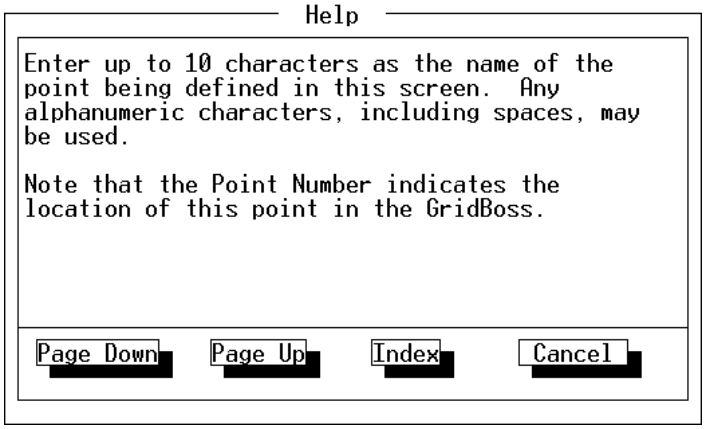
Help
Enter up to 10 characters as the name of the point being defined in this screen. Any alphanumeric characters, including spaces, may be used.
Note that the Point Number indicates the location of this point in the GridBoss.
Page Down
Page Up
Index
Cancel

Figure 10-2. Example Context-Sensitive Help Window

10.2.3 Index Help

If you want to see a list of all help topics, use the **Index** pushbutton. In the resulting list, select the desired topic either by clicking on the name with the mouse, or by using the cursor keys to highlight the name and then pressing Enter. Another way to bring up this list is by using a menu item, as described in Section 10.4, Help Contents, on page 10-4.

The Help topics in the Index consist mainly of parameter names and menu options. Note that some topic names have been abbreviated. For example, Analog Input functions appear with "AI" in front of the name, such as in AI Alarms, AI Scanning, or AI-Analog Inputs.

10.3 KEYS

Selecting the **Keys** item in the Help menu brings up the Help window shown in Figure 10-3.

This Help window tells you that if you have a mouse or other pointing device such as a trackball, it is usually easier to use it instead of the keyboard for getting around in the menus and screens. However, the keyboard can do everything that a mouse can. The rest of the text in the Help window details how to use the keyboard.

For additional information on using the keyboard, refer to Keyboard and Pointing Devices in Section 1.

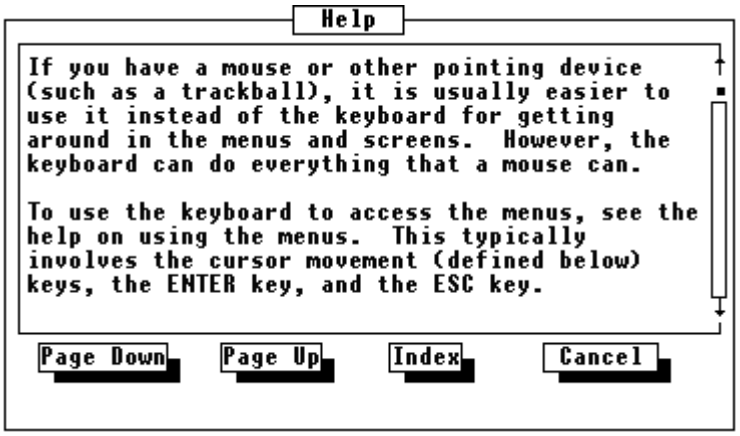
Help
If you have a mouse or other pointing device (such as a trackball), it is usually easier to use it instead of the keyboard for getting around in the menus and screens. However, the keyboard can do everything that a mouse can.
To use the keyboard to access the menus, see the help on using the menus. This typically involves the cursor movement (defined below) keys, the ENTER key, and the ESC key.
Page Down
Page Up
Index
Cancel

Figure 10-3. Help on Keys

10.4 HELP CONTENTS

If you want to go directly to an index of help screens, you can select the **Help Contents** item from the Help menu. A Help window appears with a comprehensive list of help topics in alphabetical order, as shown in Figure 10-4. This is the same as the list obtained by using the Index pushbutton in the various Help windows.

In the resulting list of help topics, select the desired topic either by clicking on the name with the mouse, or by using the cursor keys to highlight the name and then pressing Enter.

The Help topics in the Index consist mainly of parameter names and menu options. Note that some topic names have been abbreviated. For example, Analog Input functions appear with "AI" in front of the name, such as in AI Alarms, AI Scanning, or AI-Analog Inputs.

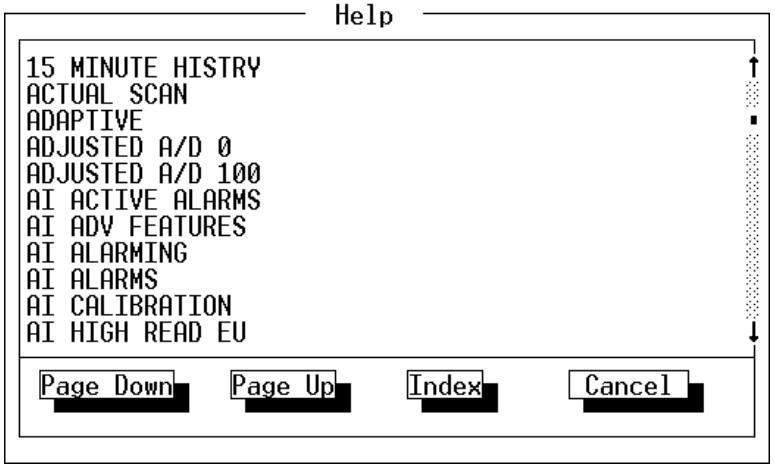

Figure 10-4. Help Contents

10.5 ABOUT

Selecting the **About** option displays the dialog box shown in Figure 10-5. The Version number, creation date, and the serial number of the GRIDLINK software display. Press the **OK** pushbutton to close the dialog box.

Figure 10-5. "About" Dialog Box

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APPENDIX A — TIMED DURATION OUTPUT

A.1 INTRODUCTION

This appendix is intended to assist you in the setup, configuration, and operation of a Discrete Output point (see configuration screen in Figure A-1) using the TDO (Timed Duration Output) function.

This appendix contains the following sections:

Information	Section	Page Number
Introduction	A.1	A-1
Enabling The TDO Function	A.2	A-2
Defining The Output Pulse	A.2.1	A-2
Defining The Engineering Units	A.2.2	A-2
Accuracy/Resolution	A.2.3	A-3
Time On	A.2.4	A-3
TDO Modes	A.2.5	A-3
Timed Duration (TDO)	A.2.5.1	A-4
Toggled	A.2.5.2	A-4
TDO Toggle	A.2.5.3	A-4
Cycle Time (TDO Toggle Only)	A.2.6	A-4

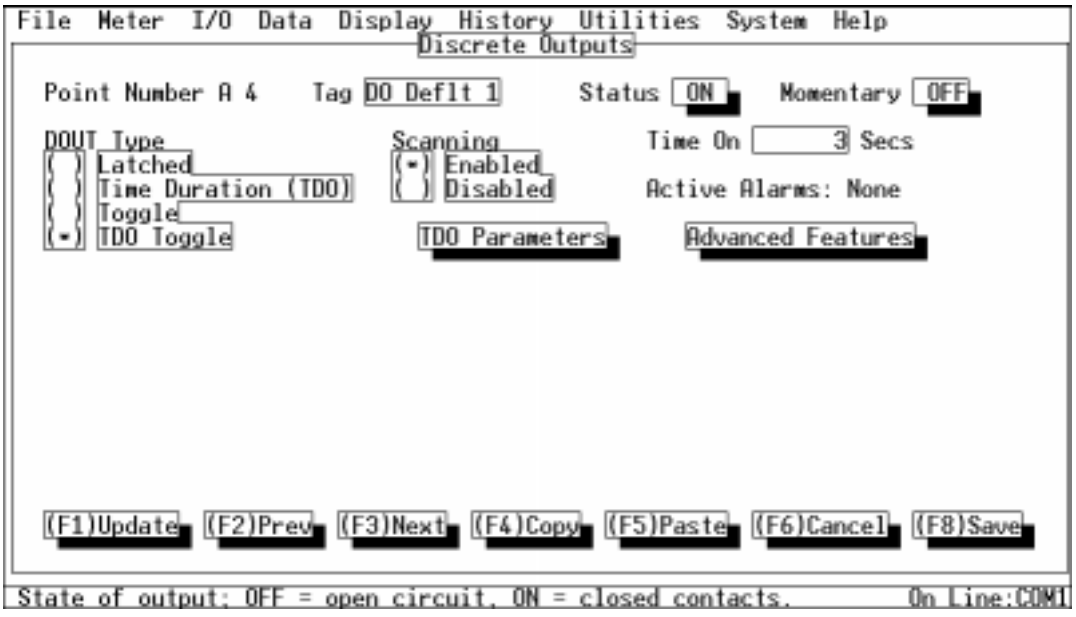

Figure A-1. Discrete Output Dialog

A.2 ENABLING THE TDO FUNCTION

The TDO function is enabled through GRIDLINK by selecting DO from the I/O menu. Refer to Figure A-1. Select **Timed Duration (TDO)** in the DOUT Type field. In the TDO mode, parameters for the engineering unit (EU) conversion are activated.

A.2.1 Defining The Output Pulse

In the Discrete Outputs dialog, press the **TDO Parameters** pushbutton. Refer to Figure A-2.

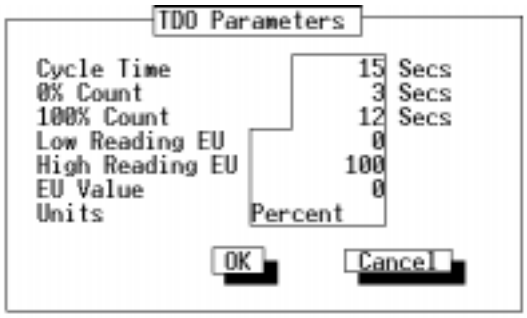

Figure A-2. Timed Duration Output

The output pulse from the TDO function must be defined for proper engineering unit (EU) conversion. The minimum pulse width (0% Count) and the maximum pulse width (100% Count) define the minimum and maximum ON time of the output pulse. The values entered in the 0% Count and 100% Count are the number of seconds the output is ON.

Example:

A TDO is used to emulate a field instrument measuring flow. The TDO outputs a pulse width of 3 seconds for no flow and a pulse width of 12 seconds for 1000 MCF per day flow.

0% Count = 3 seconds
100% Count = 12 seconds

A.2.2 Defining The Engineering Units

The engineering units (EUs) are defined by entering range values that correspond to the 0% Count and the 100% Count. These values are entered in the Low Reading EU and High Reading EU fields.

Example:

A TDO is used to emulate a field instrument measuring flow. The TDO outputs a pulse width of 3 seconds for no flow and a pulse width of 12 seconds for 1000 MCF per day flow.

0% Count = 3 seconds
100% Count = 12 seconds

Low Reading EU = 0
High Reading EU = 1000

A.2.3 Accuracy/Resolution

The accuracy of the output depends upon the sample rate of the GridBoss (typically 50 ms) and the width of the maximum pulse. For the preceding example, the accuracy (in percent) is:

$$\text{accuracy} = \frac{\text{sample rate}}{\text{max. pulse width}} \times 100 = \frac{50\text{ ms}}{12\text{ sec}} \times 100 = 0.42 \text{ percent}$$

A.2.4 Time On

The Time On field is located in the main Discrete Outputs screen. Refer to Figure A-1. The Time On field is calculated from the entered EU Value and the previous definitions of 0% Count, 100% Count, Low Reading EU, and High Reading EU entered in the TDO Parameters screen. Refer to Figure A-2. The calculation formulas are:

EU Span = High Reading EU Value - Low Reading EU
Count Span = 100% Count - 0% Count

$$\text{On Time} = \frac{\text{Entered EU Value} \times \text{Count Span}}{\text{EU Span}} + 0\% \text{ Count}$$

A.2.5 TDO Modes

There are three modes of operation possible with the TDO function:

- A single-pulse output – Timed Duration (TDO).
- A single-pulse output and toggled (continuous-pulse) output – Toggled.
- A continuous-pulse output – TDO Toggle.

A.2.5.1 Timed Duration (TDO)

The single-pulse output (plain TDO) is enabled through the GRIDLINK software by selecting DO from the I/O menu. Refer to Figure A-1. Select **Timed Duration (TDO)** in the DOUT Type field.

The single-pulse output can be triggered by writing to the **Status** or the **EU Value** parameter of the DO point. This can be accomplished directly, by a PID point, or by an FST.

A.2.5.2 Toggled

The single-pulse output (toggled TDO) is enabled through the GRIDLINK software by selecting DO from the I/O menu. Refer to Figure A-1. Select **Toggled** in the DOUT Type field.

The single-pulse output can be triggered by writing to the **Status** or the **EU Value** parameter of the DO point. This can be accomplished directly, by a PID point, or by an FST.

A.2.5.3 TDO Toggle

The continuous-pulse output (TDO Toggle) is enabled through the GRIDLINK software by selecting DO from the I/O menu. Refer to Figure A-1. Select **TDO Toggled** in the DOUT Type field.

A continuous pulse is generated with the pulse length being controlled by writing to the **Cycle Time** parameter in the DO point. This can be accomplished directly or by an FST. Refer to Cycle Time (TDO Toggle Only).

A.2.6 Cycle Time (TDO Toggle Only)

Cycle Time is defined in the TDO Parameters screen. Refer to Figure A-2. The Cycle Time entry is used to define the OFF time in the TDO Toggle mode. The OFF time is calculated by the formula:

Off Time = Cycle Time - On Time

Example:

A TDO is used to emulate a field instrument measuring flow. The TDO outputs a pulse width of 3 seconds for no flow and a pulse width of 12 seconds for 100 MCF per day flow. The output is repeated every 15 seconds.

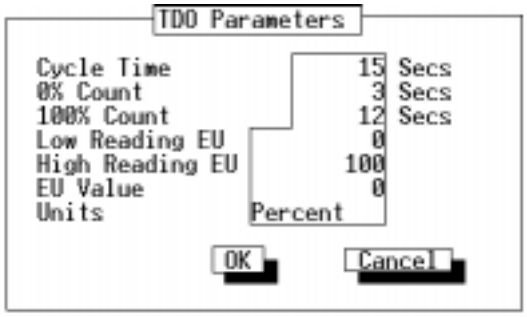

Figure A-3. TDO Parameters

If the Cycle Time is less than, or equal to the On Time, the OFF time is set to one. Care must be taken in configuration (including other places such as FSTs) to ensure that **the Cycle Time remains greater than the calculated On Time** for proper operation.

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GLOSSARY OF TERMS

A

AGA — American Gas Association.

AI — Analog Input.

AO — Analog Output.

Analog — Analog data is represented by a continuous variable, such as a electrical current signal.

AP — Absolute Pressure.

APC — Adaptive Predictive Control.

ASCII — American (National) Standard Code for Information Interchange.

B

Built-in I/O — I/O channels that are fabricated into the ROC, FloBoss, and GridBoss controller; they do not require a separate module. Also called "on-board" I/O.

C

COM1 — Port on the ROC364, FloBoss 500-series, and GB600-series that may be used for host communications, depending on the installed communications card. On the FloBoss 407, this port is built-in and dedicated to RS-232 serial communications.

Configuration — Typically, the software setup of a device, such as a ROC, FloBoss, or GridBoss controller that can often be defined and changed by the user. Can also mean the hardware assembly scheme.

CSA — Canadian Standards Association.

D

DB — Database.

dB — Decibel. A unit that gives the ratio of the magnitudes of two signals on a logarithmic scale.

DCD — Carrier Detect communications signal.

DI — Discrete Input.

Discrete — Input or output that is non-continuous, typically representing two levels such as on/off.

DO — Discrete Output.

DMM — Digital multimeter.

DP — Differential Pressure.

DR — District Regulator.

DTR — Data Terminal Ready modem communications signal.

Duty Cycle — Proportion of time during a cycle that a device is activated. A short duty cycle conserves power for I/O channels, radios, etc.

DVM — Digital voltmeter.

E

EEPROM — Electrically Erasable Programmable ROM, a form of permanent memory.

EIA-232 — Serial Communications Protocol using three or more signal lines, intended for short distances.

EIA-422 — Serial Communications Protocol using four signal lines.

EIA-485 — Serial Communications Protocol requiring only two signal lines. Can allow up to 32 devices to be connected together in a daisy-chained fashion.

EMF — Electro-motive force.

EMI — Electro-magnetic interference.

ESD — Electronic Static Discharge.

EU — Engineering Units.

F

Firmware — Internal software that is factory-loaded into a form of ROM. In the ROC, FloBoss, or GridBoss controller, the firmware supplies the software used for gathering input data, converting raw input data calculated values, storing values, and providing control signals.

Flash ROM — A type of read-only memory that can be electrically re-programmed. It is a form of permanent memory (needs no backup power).

FM — Factory Mutual.

FSK — Frequency shift keyed.

FST — Function Sequence Table, a type of program that can be written by the user in a high-level language designed by Fisher Controls.

G, H

GB601 — District Regulator Controller, Fisher Control's microprocessor-based unit that provides remote pressure monitoring and control in a GridBoss system.

GB602 — Low Pressure Point Controller, Fisher Control's microprocessor-based unit that provides remote pressure monitoring and control in a GridBoss system.

GFA — Ground fault analysis.

GND — Electrical ground, such as used by the ROC, FloBoss, or GridBoss controller power supply.

GP — Gauge Pressure.

GridManager – Host software used to configure and monitor GridBoss controllers in a system.

GRIDLINK — Configuration software used to configure GridBoss controllers to gather data, as well as most other functions.

I, J

I/O — Input/Output.

IEC — Industrial Electrical Code.

K

Kbytes — Kilobytes.

kHz — Kilohertz.

Kixcel — An actuator that receives a control signal (Analog Output or Discrete Output pair) from the GB601 and converts the signal into an outlet pressure to adjust the Setpoint at the DR.

L

LCD — Liquid Crystal Display. Display only device used for reading data.

LED — Light-emitting diode.

LOI — Local Operator Interface. Refers to the serial (RS-232) port on the ROC, FloBoss, or GridBoss controller through which local communications are established, typically for configuration software running on a PC.

LPM — Lighting Protection Module. Use this module to provide lightning and power surge protection for ROC, FloBoss, and GridBoss units that use I/O.

M

mA — Milliamp(s); one thousandth of an ampere.

MCU — Master Controller Unit.

MPU — Micro-processor Unit.

mW — Milliwatts, or 0.001 watt.

mV — Millivolts, or 0.001 volt.

N

NEC — National Electrical Code.

NEMA — National Electrical Manufacturer's Association.

O

OH — Off-Hook modem communications signal.

Off-line — Accomplished while the target device is not connected (by a communications link). For example, off-line configuration is configuring a ROC, a FloBoss, or a GridBoss controller in a electronic file that is later loaded into the units.

Ohms — Units of electrical resistance.

On-line — Accomplished while connected (by a communications link) to the target device. For example, on-line configuration is configuring a ROC while connected to it, so that current parameter values are viewed and new values can be loaded immediately.

OP — Operator Port; see LOI.

Opcode — Type of message protocol used by the ROC, FloBoss, or GridBoss controller to communicate with the ROCLINK, GRIDLINK, or GV101 software, as well as host computers with ROC driver software.

P, Q

Parameter — A property of a point that typically can be configured or set by the user. For example, the Point Tag ID is a parameter of an Analog Input point. Parameters are normally edited by using configuration software running on a PC.

PC — Personal computer.

PI — Pulse Input.

PID — Proportional, Integral, and Derivative control.

Point — Software-oriented term for an I/O channel or some other function, such as a flow calculation. Points are defined by a collection of parameters.

Point Number — The rack and number of an I/O point as installed in the ROC, FloBoss, or GridBoss controller.

PSTN — Public switched telephone network.

PT — Process Temperature.

PTT — Push-to-talk signal.

Pulse — Transient variation of a signal whose value is normally constant.

PV — Process variable.

R

RAM — Random Access Memory. In a ROC, it is used to store history, data, most user programs, and additional configuration data.

RBX — Report-by-exception. In a ROC, it always refers to spontaneous RBX in which the ROC contacts the host to report an alarm condition.

RFI — Radio frequency interference.

RI — Ring Indicator modem communications signal.

ROM — Read-only memory. Typically used to store firmware.

RTD — Resistance Temperature Detector.

RTS — Ready to Send modem communications signal.

RTV — Room Temperature Vulcanizing, typically a sealant or caulk like silicone rubber.

RXD — Received Data communications signal.

S

SAMA — Scientific Apparatus Maker's Association.

Sensor Module — The SM provides static pressure inputs to the GridBoss Controller for the pressure calculation.

Soft Points — A type of ROC, FloBoss, or GridBoss point with generic parameters that can be configured to hold data as desired by the user.

SP — Setpoint, or Static Pressure.

SPI — Slow Pulse Input

SRAM — Static Random Access Memory. Stores data as long as power is applied; typically backed up by a lithium battery or supercapacitor.

T-Z

TDO — Timed Discrete Output, or Timed Duration Output.

TLP — Type (of point), Logical (or point) number, and Parameter number.

TXD — Transmitted Data communications signal.

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